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Charles C. Tucker

LOS ANGELES - At first glance, Charles Tucker seems an unlikely candidate for DP success.

Though he knows how to write code, his experience as a staff programmer is practically nonexistent. Nor has he ever managed a computing shop, logged a single hour as a systems analyst or held any of the other jobs where upwardly mobile DPers have traditionally cut their

Sidestepping DP Sped His Move To Executive Suite

> By Jeffry Beeler CW West Coast Bureau

This is another profile in Computerworld's occasional series on DP professionals who climbed the executive ladder by being businessmen

professional teeth.

In fact, the gaps in Tucker's training would seem to disqualify him from all but the computing field's most menial positions. Yet despite its seeming inadequacy, Tucker's background has stood him in exceptionally good stead.

In his 12 years of experience in the computing field, Tucker has bounded up the corporate ladder at a pace that has made many of his (Continued on Page 4)

DBMS Independence Held Vital to DP Future

By Marcy Rosenberg

CW Staff PHOENIX - Can we afford the data

base future?

Yes, if we develop applications programs that keep us as independent of the data base management system (DBMS) as possible, and if we pour sufficient resources into "people maintenance," according to Dr. David M. Kroenke, independent data base consultant in Mercer Island, Wash,, and author of Data Base: A Professional's Primer.

Why DBMS independence? Because conversion of applications programs from one DBMS to another looms as a possibility for all installations

Kroenke told an audience at Database '80, sponsored by the IDMS User Association, here last week that many situations call for conversion: when an installation buys applications packages with an imbedded DBMS different from the one that is installed, for

The move to distributed processing also spells the need for DBMS independence. One of Kroenke's clients, for example, uses four vendors' DBMS software for different applications - IBM's IMS for manufacturing, Intel Corp.'s System 2000 for financial and management uses, an inventory package in which Cincom Systems, Inc.'s Total is imbedded and finally, Adabas from Software AG.

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Noting that the client is "heading down the pike at 900 miles an hour to distributed processing," Kroenke posed the question, "how will this user move applications from one system to

Two Strategies

Planning for DBMS independence from the start can avoid such a dilemma. Kroenke proposed two strategies for achieving DBMS indepen-

The first, a short-term approach, calls for separating applications logic from DBMS logic.

Normally, systems contain three types of imbedded and interconnected logic: edit logic, applications logic and DBMS logic. Kroenke maintained that it is possible to write utilities for func-tions that are DBMS-dependent and so isolate them from applications logic.

He called his second, long-term method, "a little more blue sky, a bit

more expensive, but more promising."
That method applies the Ansi X3 Standard Planning and Requirements Committee (Sparc) data model to maximize data independence.

The Ansi X3 model contains three

Performance Up, Price Down

Univac Upgrades Mid-Range Line

By John Whitmarsh

CW Staff NEW YORK — Univac introduced a small to medium-range general-purpose system last week that reportedly delivers 50% greater performance than its predecessor — at half the price.

The Univac System 80 is a "market replacement" for low-end Series 90 models and can be used as a standalone system or within a distributed

Fed's Restraints On Credit to Hit Financial Systems

By Rita Shoor CW Staff

ATLANTA - Credit restraints recently announced by the Federal Reserve Board in the wake of President Carter's March 14 statement on the economy may result in major changes to DP systems at financial institutions throughout the country.
The Fed requires that banks and

others providing credit cards, overdraft privileges or other types of revolving credit must freeze 15% of new credit extended into a Federal Reserve account. Marginal-reserve requirements on a bank's managed liabilities, such as negotiable certificates of deposit, will also be raised to 10% from the present 8%.

(Continued on Page 6)

processing network, the company said. In the same breath, the company emphasized it would continue its evolutionary software policy and extend the migration path for Series 90 users. Thus, the System 80 is equipped with an enhanced OS/3 operating system that is compatible with all Series 90s and operates concurrently in interactive, distributed, batch and remote telecommunications modes on the Sys-

The System 80 is aimed squarely at IBM System/3, System/38 and 4331 users in the manufacturing, distribution, medical, transportation and other industries, Univac said.

Depending upon the configuration, System 80 users will receive a microprocessor-based system that packs up to 1M byte of main memory and supports multijobbing, multitask-ing and up to 40 radially connected workstations plus a range of peripher-

Two Versions

The System 80 is available in two versions, Model 3 and Model 5. Model 3 includes 262K bytes of main memory, while Model 5 offers 1M byte of memory. The Model 3 is fieldupgradable to a Model 5 with a High-Performance Control Storage (HP-COS) option for a gain of 55% more processing power, according to the

Univac said that the System 80 Model 3 equals the performance of the Series 90/30, while the Model 5 delivers 50% greater performance than the 90/40.

Depending upon the configuration, purchase prices range from \$70,000 to \$325,000. Monthly maintenance charges are extra, ranging from \$371 to \$527

Five-year lease plans are available. They range from \$2,250 to \$9,000 and include software maintenance. A six-(Continued on Page 7)

Abacus Gives Way to 4300s In 1981 Chinese Head Count

By Marguerite Zientara CW Staff

NEW YORK - The 1981 head count for the People's Republic of China will be conducted using IBM 4300 series computers, according to a letter of in-tent signed by the United Nations and IBM here recently.

Financed by the UN's Fund for Pop ulation Activities, the agreement calls for 15 Model 4331s and one 4341 and related data entry equipment for the census and subsequent demographic studies aimed at reaching zero population growth by the year 2000.

The computers are due to arrive in China during a two-year period start-ing "later this year," according to an IBM spokesman. Each Model 4331 will go to a single province, and a 4341 will be centrally located at the China State Statistical Bureau in Peking.

Besides the mainframes, the equipment will include at least one 5280 intelligent terminal system in each prov-ince, "and probably more than that," the spokesman added. The 5280 is basically a single- or dual-keyboard display station that supports the host by validating and editing information at local and remote locations before processing by the host.

The remaining 14 provinces of China could be served by "other vendors," the IBM spokesman said, but according to Joseph Van Arendonk, chief of the UN's Asia Section within the Population Fund, "The figure of 15 IBM computers for the provinces is not nec-

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Editor E. Drake Lundell Jr.

Managing Editor

nior Editors: Industry Software Marcia Blumenthal Marcy Rosenberg Brad Schultz John C. Whitmarsh

Senior Writer:

West Coast Washington, D.C.

> Staff Writers Tom Henkel Timothy J. Scannell Connie Winkler Marguerite Zientara

Chief Copy Editor Cheryl M. Gelb Nancy Fleming Catherine Marenghi Steve Milmore Barbara T. VanScovoc

Martha Taylor

Photography Editor Ann Dooley Editorial Assistants

Editorial Cartoonist

Contributors: J. Daniel Couger Education **Taylor Reports** Alan Taylor

For Sales, Circulation and Production contacts, see inside back page.
Please address all correspondence to the appropriate department at 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153

OTHER EDITORIAL OFFICES:

West Coast: 407 California Avenue, Suite 10, Palo Alto, California 94306. Phone: (415) 328-8064.

Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C.

20045. Phone: (202) 347-6718. England: Steve Burton, IDG Publishing Ltd., 140-146 Camden Street, London NW1 9PF Phone: 01-267 1201. Telex: 851 264737.

W. Germany: Eckhard Utpadel, CW Publika-tionens, Friedrichstrasse 31, 8000 Munich 40,

Phone: (089) 34-90-61. Telex: 5215350.
Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo, 141. Phone. hi Gotanda 1-chome, Shinagawa-ku, To-141. Phone: (03) 445-6101. Telex: 12424461.

Australia: Alan Power, Computerworld Pty Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: SECCO

Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th floor 20031 Rio de Janeiro, RJ Brazil, Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Kevin Kelleghan, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F., Phone: (905) 314-4218, (905)

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Also Plans Facsimile Demo

SBS Set to File First Tariff in May

By Phil Hirsch

CW Washington Bureau

NEW YORK -Satellite Business Systems (SBS) will file its first tariff with the Federal Communications Commission next month and, at about the same time, will begin demonstrat-ing a facsimile machine capable of transmitting "more than" 60 page/min, President Robert C. Hall said here

Hall told the New York Society of Security Analysts that the facsimile machine, developed by Addresso-graph-Multigraph Corp. under an SBS contract, will reproduce text and graphics as well as "the best copier." Later this year, he reported, SBS also plans to demonstrate a video teleconferencing system developed by E-Systems, Inc.

Another demonstration, scheduled to begin "before the end of this year," Hall said, will utilize coaxial cable and microwave, instead of telephone company-provided circuits, to connect data communications users in San Francisco and New York with local SBS earth stations [CW, April 14]. These users will also be linked to Tymnet, the domestic and international packet-switched network operated by a subsidiary of Tymshare, Inc.

The coaxial and microwave local distribution facilities will enable users to transmit data at up to 56K bit/sec, end-to-end. "This is an important program for resolving some of the transmission bottlenecks created by traditional local-loop facilities in metropolitan areas," Hall said. "To date, the development of high-speed business communications has been retarded by inadequate, costly methods of local distribution.

Several other innovations are in-

cluded in SBS' service, scheduled to begin commercial operation next January. Voice messages will be digitized, and digital speech interpolation (DSI) will be employed to reduce bandwidth requirements, presumably reducing

costs to the user as well.

Basically, DSI allows multiple voice conversations to be carried simultaneously on the same channel by filling the normal pauses in each with portions of the others.

The SBS network will also feature dynamic bandwidth reallocation, providing each customer with transmission capacity "when and where he needs it, on a minute-by-minute basis," Hall said. "This has significant benefits ... because [the customer] can avoid the expense of buying fulltime capacity to meet peak loads.

SBS backbone circuits will transmit data at speeds up to 6.3M bit/sec, making on-line transfers of bulk files practical for large organizations, he added. "At 56K bit/sec, it would take almost two days to transmit a one billion byte file, which might be the daily sales transactions for a large retailer But SBS will transmit it in an hour and a half at 1.5M bit/sec or in 23 minutes at 6.3M bit/sec.

Market to Quadruple

Hall predicted the U.S. telecommunications market will quadruple in the next decade and generate annual revenues of \$100 billion by 1990.

Rapidly rising office costs will be the major cause of this growth, he said. The current bill is \$600 billion/year, and it is increasing at an annual rate of 12% to 15%. "An even higher growth rate - 15% or 20% - is projected.

By 1989, he contended, office costs will reach \$1.5 trillion/year, or onequarter the gross national product, "if nothing is done to improve productivity." His basic point was that telecommunications provides an effective means of reducing these costs.

Hall declined to specify what rates will be offered in the upcoming SBS tariff. But he did say that SBS customers that share transmission facilities will pay rates "5% to 20%" less than MTS/Wats rates. For users with heavy voice traffic loads," the sav-

ings will range from "10% to 20%."
Where an SBS network is cost-justified for voice applications, others will be available "at very low incremental cost," Hall added. "The incremental cost to an SBS user for 56K bit/ ec data circuits, for example, [will be] far below the cost of AT&T's Digital Data Service at distances greater than 200 miles. Even at shorter distances, if the customer chooses to share his transmission channel among locations in a switched mode, his cost [will be] about half the AT&T cost.

SBS plans to launch its first two satellites next October and follow with a third in 1983. "By that time," Hall said, "we also expect to have com-pleted the design for our second-generation satellites." The company hopes to launch the first of these in 1985-86.

Each first-generation satellite will cost \$20 million and have a total Transmission capacity of 480M bit/sec - i.e., 8,600 data circuits, each operating at 56K bit/sec.

Hall reported that five customers have already contracted to use the SBS network: Aetna Life and Casualty Co., IBM, Boeing Computer Services, Isa-comm and Travelers Insurance Co.

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The next time your beloved says "guess what went up at the supermarket today," try this ploy:

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Who says you can't do anything about inflation?



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Inflation Blamed

Four More Vendors Hike Product, Service Prices

By a CW Staff Writer

Blaming inflation, four more vendors have announced price hikes on DP products and services.

They include Perkin-Elmer Corp., Northern Telecom Systems Corp., General Automation, Inc. and Mini-Computer Business Applications, Inc.

Effective May 1, Perkin-Elmer's Computer Systems Division in Ocean-port, N.J., which sells minicomputers and peripheral equipment, will charge averages of 6% more on hardware, 10% more on software and 5% more on maintenance.

In Minneapolis, the Northern Telecom Computer Systems Group raised lease and purchase rates on selected product lines. Already in effect, those jumps "are a result of higher material and labor costs, as well as increasing financing costs associated with our lease-based business," a spokesman explained.

Lease prices for most Northern Telecom systems rose 7% to 12%, varying by product and term of lease. The vendor boosted tags on its Model 74 and 76 systems from 4% to 12%, depending on configuration, and increased prices on its Model 291 and 292 CRT terminals by 3% to 4%.

In Anaheim, Calif., GA announced that an average price hike of 7% on its hardware and software products will take effect May 1. This strategic move, the first general price increase in company history, was necessary to counteract inflationary pressures that had significantly increased both the cost of materials and the cost of labor.

Finally, Mini-Computer Business Applications, a Glendale, Calif., company that sells commercial applications software to minicomputer users, blamed inflation for "50% to 100%" boosts in software licenses.

Scheduled to take effect during the next three months, the changes reportedly affect the vendor's accounting and "vertical market" packages for selected minicomputers from Digital Equipment Corp., Data General Corp., Wang Laboratories, Inc., Texas Instruments, Inc. and Plessey Peripheral Systems, Inc.

Bypassing Computer Room Sped Rise to Executive Suite

(Continued from Page 1)
more technically minded but specialized contemporaries seem sluggish.
Today, as vice-president of planning
and information services for Twentieth Century-Fox Film Corp., he calls
the shots for a 78 member DP department whose annual budget totals
about \$4.3 million.

As one of his firm's highest ranking executives, Tucker only occassionally involves himself in the details of Fox's day-to-day computing operations, the main responsibility for which rests with a full-time management information systems director.

Instead, he devotes the bulk of his time to developing and implementing long-range information systems plans for Fox's business units throughout the world. He also sets the company's strategic data communications policies and spearheads its corporate-level planning in general.

By his own admission, Tucker is something of a rarity among his fellow DP professionals: an individual who strays from his fields orthodox career paths but who nevertheless advances beyond his narrow technical specialty to assume a position of top general management.

Corporate Climb

Tucker's rise up the corporate ladder began in 1966 when, after a two-year stint in the U.S. Army, he joined Westinghouse Electric Corp. as an engineer in the firm's missile-launching and handling department. He held that job until September 1967 when he left Westinghouse to begin work on a Master's degree in business administration (MBA) at the University of Santa Clara (Calif.), the same institution where, three years earlier, he had earned a Bachelor's degree in mechanical engineering.

By June 1968, he had received his MBA and had launched his career in computing by joining IBM as a small business systems salesman. In his nearly four years with IBM, Tucker learned the fundamentals of his new field mainly through a constant barrage of formal training courses that ranged in subject material from sales techniques to programming.

In 1972, Tucker left IBM to go to work as a management consultant for McKinsey & Co., a locally headquartered consulting firm. In his new position he served primarily as an advisor and problem-solver for Fortune 500 companies with ailing computing sys-

Tucker considers his consulting experience invaluable preparation for his current duties because, he said, it taught him how to run a DP shop well by showing him first-hand where other users had gone astray.

After slightly less than a year at McKinsey & Co., Tucker again switched jobs and went to work for his current employer as director of corporate information planning. He held the position from early 1977 until last June, when he was promoted to his current post. Now he typically reports to Fox's senior vice-president of finance and administration.

Breadth of Experience

For some, Tucker's failure to serve a lengthy apprenticeship as a staff programmer or a systems analyist might seem a serious drawback in a field as rapidly changing and technically challenging as computing. But for Tucker himself, the decision to bypass the usual stepping stones to DP advancement has proven an incalculable boon, and it has provided him with a breadth of management experience that few DPers can match.

So many DP managers, Tucker explained, enter their chosen field at the bottom of the chain of command, often as entry-level programmers, and slowly work their way up the computing-room hierarchy. Such a conventional career path has the advantage of giving DPers a strong background as technologists, but at the same time it also tends to hurt their opportunities for lateral advancement by severly limiting their knowledge of subjects outside of their own specialty.

Tucker, by contrast, comes to the computing field from a generalist's, not a specialist's, background and as such has had the benefit of years of exposure to a wide assortment of business disciplines. The variety of his management experiences has proven one of the keys of his successful assault on the corporate boardroom, he explained.

Another important factor in his ascent to the upper management echelons has been his ability to communicate effectively, both in oral and written form. "I think I've learned how to translate the concepts and terminology of the technocrats into a basic financial language that a company president or board chairman can understand and use to make logical management decisions," Tucker said.



Shanghai Street Scene

W Photo by P.McGovern

Abacus Replaced by 4300s In 1981Chinese Head Count

(Continued form Page 1)
essarily correct; it may be supplying
more."

Such uncertainties stem from the fact that the project awaits formal approval, expected in June from the population fund's board of directors. Neither the exact dollar value of the equipment nor the exact dates of its arrival has yet been determined, Van Arendonk noted.

Census by Abacus

Edging out bidders from Japan, Hungary, East Germany, Germany, Norway and the U.S., IBM is expected to help propel Peking's population count from the age of the abacus to electronic data processing.

China's last census was conducted by abacus in 1964, but the results were not announced until 1966-1967, according to Leo A. Orleans, a China population expert in the Library of Congress.

Previous to that, the last census was in 1953. While China's 1964 census asked five questions, the 1981 effort is expected to ask 10.

The new computers are expected to provide China with more accurate and voluminous data and to answer in months questions that once took years, according to the UN.

In addition, it is hoped that the new equipment will tell China where birth control projects are working, where they lag and what contraceptive devices are needed.

While China and the UN entertain high hopes of a technological revolution in terms of China's census operations, some observers are skeptical whether the country will be able to effectively use the machinery by the 1981 census period.

While acknowledging China's need for scientific and technological advancement in general, Orleans noted, "In population studies, you still have to rely on the data gathering process, which in China has to be done by people in rural areas who have limited knowledge and appreciation of the importance of accuracy in statistics.

"It's what's fed into the computer, after all, that comes out," Orleans noted, "and that's where much of my skepticism lies."

As for the possibility that China is attempting "too much, too soon," Orleans noted that the Chinese have never used computers in this type of an effort. "I think it requires quite a bit of preparation and training."

Chinese representatives have visited the UN and the Bureau of the Census "only in the last few months" to learn the necessary techniques, he added. "They expect to go out and take a census in 1981, and I just feel that it should take a little longer to set all this ""."

IBM does not plan to send permanent technical support personnel to China for the project, but will provide technicians during the installation, service and programmer training period.

Decentralization to Disappoint Many: Study

By Brad Schultz

CW Staff
IRVINE, Calif. - Computing costs will grow faster than ever in the 1980s, outpacing growth in benefits and disappointing many users that blithely aunch upgrades without considering DP's organizational impacts.

Those conclusions by researchers at he Public Policy Research Organization (PPRO) here apply especially to users undergoing decentral-ization. As explained in a forthcoming research paper, the decentralized DP trend may not prompt more sharing of data and services over networks, as commonly believed, because dispersed users will have incentive to boost their political power within organizations by hoarding resources.

Dr. Kenneth Kraemer, director of the University of California "think tank," and research scientist John King warned that decentralization will make many organizations more difficult to manage. The costs associated with installing and maintaining decentralized systems will rise substantially throughout the next several years, they found.

Based on extensive studies of users across the U.S., the PPRO draft pre-dicted that telecommunications costs will drive up the overall cost of computing as they stimulate the decentralized DP movement. Users will rush to

buy the new generation of equipment and services without fully understanding the financial and political repercussions entailed by implementation, Kraemer and King suggested.

Underestimating Costs

At PPRO, the question of how much computing costs encompasses far more than the traditional segments of a DP budget - such as outlays for procurement, operation, maintenance, development, personnel and supplies

Although other aspects are difficult to measure, PPRO researchers also monitor the expense of management's involvement with DP planning and estimate the costs of an organization's adjustment to new computer-based facilities and procedures.

From this broad perspective, Kraemer and King asserted that users typically underestimate computing costs by at least 20%. Some users were said to underestimate by more than 100%

In underestimating, users generally neglect two major cost areas. The first is outlays for DP staff and resources situated outside "official" DP centers. The other area often ignored is that of the staff time of individuals whose work on the periphery of DP functions is hampered when systems malfunction, according to the researchers.

Cost-Growth Factors

Worse yet, Kraemer and King identified a number of factors accelerating the growth of the costs users have so seriously underestimated:

• The rising market demand for DP specialists. Users are diversifying as well as increasing in number. New applications can generate a need for additional types of specialists at a site.

 The rising cost of maintenance. As sites expand, they need more maintenance man-hours, which inflation and market demand make more expensive [CW, April 14].

• The rising cost of system malfunctions. Systems now do more than remundane, repetitive manual place tasks; they do things that literally could not be done otherwise. The most advanced systems, therefore, can devastate an organization when they crash. And they crash more frequently

than simpler systems. Poor systems documentation and, at more advanced sites, poor comprehension of the complete system. Some scientists now claim that the most complicated systems are literally incomprehensible.

· Multisystem sites have become so integrated and their systems so interdependent that problems in one system can disrupt the process of interaction, so that system crashes virtually put an organization out of business.

Decentralization's Attractions

DP personnel generally prefer decentralization to centralized DP - primarily because such personnel seek direct control of computational resources as an alternative to remote dependence on a central facility, Kraemer and King

DPers want this control partly to make themselves more productive, but also for clearly political reasons, the scientists added.

Dispersed DPers in direct control of processors find it easier to coax funds out of top management for development work than do DPers driven by a host facility, they explained. Also, de-centralized DP staffs can often avoid close monitoring by penurious corporate accountants.

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Fed's Credit Restraints to Hit Financial Systems

(Continued from Page 1)

While the immediate DP needs only involved "several days of report generation to see where we stood," according to a systems analyst at one bank, the directive for banks to voluntarily discourage unsecured consumer loans and to increase their new lending by no more than 9% will have a substantial impact on automated loan systems and, in particular, on the bank credit card systems.

Some options currently being considered by the financial community as modifications to the bank card systems include annual fee capabilities, credit line decrease programs, elimination of free period on purchases and split rates on cash advances and purchases.

Depending on the option selected,

the changes to the DP system can take anywhere from "five to 20 man-days of effort," according to Sandra Fischer, vice-president and manager of Charlotte systems development at First Union National Bank in Charlotte, N.C.

If, for example, First Union decided to implement the annual fee capability in its in-house Mastercharge system, "new programs might have to be written in order to tie the annual fee to our card reissue logic," Joe Shampine, systems and programming manager at the bank, noted.

"Since the system has already been in operation for several years, the master-file might also have to be modified in order to add new checks and balances to our processing. These modifications could require somewhere between 20 to 30 man-days."

Decreased Credit Line

If a bank opted to decrease the credit line for selected customers, the programming effort would depend on whether the system's masterfile already contained the selection criteria. "If so," Shampine speculated, "a onetime conversion might be attempted."

Otherwise, extensive analysis might be required to determine which customers' records are to be modified.

A financial institution which increases the interest rate on a customer's outstanding balance will also have to allow its DP department some lead time. "Even if it was an across-the-board increase, the conversion might have to be done on a cycle basis as each customer's monthly statement was issued," Shampine observed.

New calculation logic would be required, and the new rate would have to be printed on the statements. "If the rate had been preprinted on the statement, new forms would also be required."

The implementation of a new rate on cash advances and purchases as of a given date "would probably require two separate routines to keep track of the account balances before and after that date," Shampine continued. Print programs would be modified to show the amounts to which the different rates were applied.

Service Bureaus

As complex as the DP effort appears to be for individual banking systems, the problems are compounded for credit card service bureaus who offer multiple processing choices to their members.

One complicating factor hinges on the Fed's guideline interpretations issued on April 7. "Right now, it looks as though the board may require us to provide charge-card customers with a 30-day notice of any change," Andrew H. Oreste, vice-president of marketing services for Eastern States Bankcard Association (Esba) in Lake Success, N.Y., maintained.

"But it will take a new debit transaction — a purchse or a cash advance for the customer to indicate acceptance of the new contract," he added.

Esba is a facilities management firm which, along with an affiliated company, Eastern States Monetary Services, provides DP support for some 250 to 300 members. Both Mastercharge and Visa processing are

handled by Eastern States.

"Right now, we keep track of the options we offer our members [annual fees, changing interest rates and so on] on a bank level. We don't have logic to keep track in the sense that a particular individual's rate will change as of a certain date." Oreste said.

If the Fed's current interpretation stands, it could take up to "four to six months" to add the logic required to keep track of individual accounts and to provide the necessary reports to Esba members.

A four-to-six month estimate was also provided by Leo A. Cooney, president of Charge Card Association in Detroit, Mich. "It could take that long if we're required to have a double interest rate capability in customer billing statement systems."

The service bureau maintains both Visa and Mastercharge customer records on one masterfile. File maintenance for both types of charge cards is combined into one system. This combined program logic would make the modifications to calculate different rates as of a given date even more complex and time-consuming.

Charge Card Association's DP systems issue cards and process statements for approximately 280 midwestern hanks.

"Although our actual processing costs have gone down 3% to 4% in the last five years, our costs per account have gone up some 66.2% in the same time period. The major portion of this increase is due to the cost of funds and, to a lesser degree, the write-offs credit card systems absorb because of things like fraud and stolen cards. And this is happening while our revenues are restricted by law," Cooney said.

Proposed Legislation

The Carter Administration is also proposing another piece of controversial legislation which would have a major impact on any DP system that calculates interest on deposited funds. The plan would require banks, corporations and other interest or dividend payers to withhold 15% of the payments in these accounts for the federal government.

In the opinion of Edward E. Crutchfield Jr., president and chief executive officer of First Union National Bank in Charlotte, N.C., such legislation has little chance of passage. "Small savers and dividend holders would hate it, and it would discourage small investors," he said.

However, the potential effect of such a change on DP financial systems highlights his view that "legislative changes and our competitive environment," rather than economic instability, are responsible for increasing DP requirements.

"Every one of our deposit systems could be affected by such legislation," said a DPer at another bank. "Significant modifications would be made to certificate of deposit, security and savings masterfiles.

"New calculation routines would have to be added to each of these systems. New government reports would probably be necessary and we'd have to redesign all of our customers' yearend statements. It would kill us," he concluded.

One long-term result of the inprocess modifications to financial DP

systems could be a trend towards smaller, more sophisticated processing systems with emphasis moving away from large, transaction-oriented systems.

"Financial institutions which have made their commitment to electronic funds transfer (EFT) are in a much better position to react quickly to system changes than their non-EFToriented couterparts," according to Dale Reistad, chairman of Payment Systems, Inc. in Atlanta.

PSI, a wholly owned subsidiary of American Express, provides research, consulting and publication services covering all aspects of payment systems to financial organizations. PSI's response to Carter's speech was to ask key speakers at its April 20-22 symposium to directly address issues raised in the proposed credit control package. One problem which Reistad sees is the negative reaction of bank customers to the restrictions which are being imposed via DP systems. "Banks have spent the last few years setting up a plastic credit card base to pave the

way for electronic banking services.

"After some of them make these deep cuts in the amount of credit being allowed to charge card customers," Reistad said, "it's going to be difficult for them to go back later and sell these same customers on the advantages of systems like automatic payroll deposit or telephone billing."

ACM Meet Set On DP Integrity

GAITHERSBURG, Md. — "Pathways to System Integrity" will be the theme of the 19th annual ACM/NBS Technical Symposium to be held here on June 19 at the National Bureau of Standards (NBS).

Cosponsored by the Association for Computing Machinery (ACM), the symposium will feature August Bequai, author of several books on computer crime, lecturer and Washington, D.C., attorney, speaking on "The Electronic Criminal: Are We Prepared For His Challenge?"

Other topics to be addressed include system integrity through reliability, data base, languages for personal computing and managing information resources.

The symposium will offer two general sessions and a choice of three out of 12 parallel technical sessions. An interpreter for the deaf will be on hand for both general sessions and several of the parallel sessions.

For members of the Washington, D.C., chapter of ACM and for NBS employees, registration before June 6 costs \$30. After June 6, that registration fee is \$35. Preregistration for full-time students is \$10, but \$15 after June 6. All other categories will cost \$35 before June 6 and \$40 after June 6, except for attendees using purchase orders, who will pay \$45 regardless of when they register.

For ACM members and NBS employees, the proceedings only will cost \$8, and for all others \$10. Registration fees include lunch and break snacks.

Registration can be arranged through Charles Youman, 4419 N. 18th St., Arlington, Va. 22207.

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Security Upgrade Under Way

SSA Still Probing Suspected \$500,000 Fraud

By Jake Kirchner CW Washington Bureau BALTIMORE — Social Security Administration (SSA) auditors are still searching agency DP records here for evidence of further fraud in a case that allegedly netted a group of computer criminals as much as \$500,000 [CW, March 3].

With the audit almost complete, SSA has identified only \$102,000 in fraud, although as the indictment handed down against the alleged conspirators Feb. 19 suggested, there could be much

While the investigation continues, the agency is upgrading its physical and systems security following a risk analysis conducted last summer when

ered, according to Fred Schutzman, associate SSA commissioner, Office of Assessment.

The Secret Service, which is in charge of the case, is also continuing its investigation, looking for additional fraud and accomplices, and is "quite certain there is something else," according to James E. Le Gette, acting director of the Secret Service office here.

Falsified Checks

The fraud scheme involved falsification during an 18-month period of disability payment authorizations by Janet Blair, a clerk at the SSA central records facility in nearby Woodlawn, March 31

The disability checks were allegedly cashed at a number of different banks by others indicted in the case. The scheme was uncovered, the government said, after a bank official in Philadelphia became suspicious about several checks cashed by Blair's alleged

So far Blair and two others have been charged. At this time, none of the missing money has been recovered, according to Le Gette. Blair has been placed on indefinite suspension pending the outcome of the case.

As the SSA auditors wind up their check of the computer records, the

government is preparing to go to trial on the initial indictments May 27 in the U.S. District Court here.

Schutzman explained that SSA conducted "a very secretive risk assess-ment" last August when the fraud was first uncovered. Working at night and on weekends so as to not allert anyone involved in the crime, the SSA and Secret Service agents began checking the

The Secret Service asked SSA not to make any changes in DP security that might tip off those involved in the fraud. Some changes were made qui-etly, however, and the security up-grade was completed after the indictments, he said.

Univac Replaces Mid-Range Line

(Continued form Page 1) year lease plan will be offered with a 10% reduction on hardware only.

Except for the OS/3 operating system, RPG-II language facility and utility programs, all other software is unbundled, the company said.

First customer deliveries are scheduled for December.

Functions Off-Loaded

Univac characterized the System 80 "system of microprocessors." Functions formerly performed by a single CPU can be off-loaded and distributed among as many as 18 micro-processors that operate independently and concurrently.

Main storage is 16K chip MOS and can be configured from a minimum of 262K bytes to a maximum of 1M bytes in 262K-byte increments. Memory is byte-addressable with a cycle time of 400 nsec per four-byte word.

A minimum configuration includes a 262K-byte CPU, 118M bytes of hard disk storage, a console/workstation, a diskette control unit, a paper peripheral control unit, a 300 line/min printer, a manual diskette, an autoload unit and an additional workstation

configuration upgradable to support a maximum of 1M byte of CPU memory, 40 workstations, eight remote communications lines and a mix of eight fixed or re-movable disk drives (for 946M bytes of additional on-line capacity plus 860K bytes of high-speed stoarge per drive via an optional fixed-head fea-

The OS/3 operating system supports 14 levels of multiprogramming, and six languages are available for the system: RPG-II, Cobol, Fortran IV, Basic, Basic Assembly Language (BAL) and Univac's Escort.

Application software packages tailored to various industry segments will be forthcoming, Univac said.

To increase System 80's appeal to the distribution industry, for example, the firm last week also announced the Univac Distribution Information System (Unidis), an application package expressly for distributors.

For IBM users, the company offers a series of conversion aids that will allow the System 80 to emulate the IBM System/3 and thus run RPG



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DBMS Benefits Not Automatic, Users Warned

By Marcy Rosenberg

CW Staff

PHOENIX - Data base has been oversold

Although data base management systems (DBMS) promise to reduce data redundancy, provide data security, integrity and independence and improve productivity, these benefits are not automatic, according to Mike Salzberg, consultant for the data base practice at Peat, Marwick, Mitchell & Co. in New

One of several panelists who discussed how new users should approach data base development here last week at the IDMS User Association Database '80 conference, Salzberg maintained users must plan for data integrity and security by providing backup or journals.

Similarly, users will not enjoy data independence from DBMS unless they apply development methodologies and standards for programmers to follow and use DBMS features such as report writers and queries

Improved productivity, through DBMS or otherwise, will happen only

CW at

if a trained and competent staff is in

He added that when users look for-

ward to reducing data redundancy,

they should realize there are trade-

offs: "Whenever you reduce data re-dundancy, you will sacrifice efficiency

and performance and, in effect, will

place, Salzberg asserted.

basket.

atabase '80

· Designing an interface to the information systems architecture.

· Identifying requirements for logical views

 Developing a conceptual model and schema.

· Confirming that the schema really does support the application, perhaps testing a "prototype" DBMS.

A fourth step toward a positive DBMS experience calls for defining a data dictionary methodology - deciding what dictionary features will be used; how the dictionary will relate to design, development, testing and maintenance; and whether the dictionary will be passive or active.

Finally, Salzberg advised users to audit their data bases regularly to avoid the "I left the record in the buffer" problem.

Keys to Success

Agreeing with Salzberg was Bill Walker, Cullinane Corp.'s director of internal systems, who identified design and control as the keys to successful

DBMS implementation.

He warned users of a potential design trap: "Most DBMS will get rid of data redundancy, but often you must rein-troduce redundancy to get rid of something else - like poor performance that can hurt you even more.

As for control - an aspect that "goes by the wayside in most organizations'

Walker emphasized that it involves more than backup and recovery. The DBA must know when backups were done and where tapes and archives are, and he cannot let programmers enter new programs without his knowledge.
Users should not only take advantage

of the control tools most DBMS provide - such as data base reports and schema listings - but also develop and build into the data base their own controls from Day One, he said.

Walker concluded with these words of advice: "Three primary rules for design are simplify, simplify, simplify. Three primary rules for control are complicate, complicate, complicate.

Hofstadter Wins Pulitzer Prize

NEW YORK - A computer scientist won the 1980 Pulitzer Prize for general nonfiction last week

Douglas R. Hofstadter, who holds a Ph.D. in physics and is an assistant professor of computer science at Indiana University, won the annual award for his Godel, Escher, Bach: An Eternal Golden Braid.

The book interrelates the accomplishments of Kurt Godel, an Austrian logician; M.C. Escher, a Dutch artist; and the German composer Johann Sebastian Bach. In 1935, Godel found that attempts to define all of mathematics in terms of symbolic logic are inhesently futile because they lead to contradictions of terms.

Besides exerting a profound influ-ence on philosophy, "Godel's Proof" has affected work in the theory of computation, an area of computer science that explores the logical limits of processing.

put more of your corporate eggs in one **Maximizing Benefits**

Salzberg described five steps new users must take to obtain benefits from

First, build and plan for application systems. Identify and prioritize appli-cations, he advised, and decide which are applicable to DBMS. Some may not be appropriate, for example, because of the hardware used or volume of transactions required.

Second, users need to establish a data base administrator (DBA) function in their organizations. Although there is 'no right answer" as to where the DBA belongs in the organization, Salzberg cautioned that if relegated to a low-level function, the DBA will not be looked upon as important to that organization.

Third, users must choose a data base design and development methodology and decide how to document and con trol it "so if you leave, the design can live on.

Salzberg cited steps involved in the

· Planning for a particular applica-

Theory Matches Jobs With Personality Types

PHOENIX - All the education and training in the world will not do enough to develop the DP organization a user needs if personality types are not appropriately matched with job functions, Dr. David M. Kroenke, an author and independent data base consultant, indicated here last week.

To illustrate, Kroenke referred to what he called a "power cycle." Its elements are evaluation, recommendation, decision and action, circling back again to evaluation.

When an action fails, blame travels backward in the circle, first to the individual who made the decision to act, next to the one who made the recommendation and finally to the person

who made the evaluation, he explained

Each function in the power cycle is best executed by an individual who exhibits certain personality characteris-tics, Kroenke said.

Jung Definition

To describe these characteristics, he borrowed from Carl Jung to classify individuals as either sensate - dataoriented - or intuitive - conclusionoriented.

Persons can be further classified by the way they form judgments - some are "thinking-oriented," while others "feeling-oriented," he said.

Relating this to the power cycle, Kroenke contended that "sensate feelers" are suited for evaluating action; "intuitive feelers" are best qualified for making recommendations based on evaluation; "intuitive thinkers" can best make decisions based on recommendations; and "sensate thinkers" can best implement de-

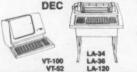
Independence Vital for DBMS

(Continued from Page 1) schemata: a conceptual schema, which presents a corporate picture of the data base: an external schema, which presents the applications program's view of the data base; and an internal schema, which presents machine, or DBMS-dependent, views.

Why people maintenance? Because the half-life of computer technology is five years. What this means, Kroenke said, is that every five years, half of what we know is outdated.

Unfortunately, "in our profession, we're woefully inadequate in supporting the people that generate programs and data," he lamented, advising that 5% of the DP budget be allocated to maintaining people through education and training.





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According to Edpaa Poll

DP Auditors' Pay Up 16% in Past Two Years

By Brad Schultz

CW Staff
HANOVER PARK, Ill. — DP auditors' salaries rose an average 16.9%
during the past two years, according to a report published recently by the EDP Auditors Association (Edpaa).

That figure, derived from a survey of association members, agrees roughly with other surveys released during the past several months, suggesting that auditing has become one of the faster growing DP specialties in terms of average compensation.

The 16.9% average also shows modest defiance of President Carter's attempts to hold the nation's overall salary growth rate to 7% per year which, compounded annually, comes to about 14.5% per two years.

Audit Managers Only 13%

The slowest growing salary levels within DP auditing are managerial, the report indicated. DP audit managers on Edpaa rolls showed a 13% average increase during the 1978-79 period. Pay to assistant DP audit managers rose just 12.5%.

In contrast, trainees experienced

IBM Quarter Gains Only 2.2%

ARMONK, N.Y. — Inflation and users' hesitation to purchase equipment took a toll on IBM's first-quarter earnings.

Although earnings advanced 2.2% from last year's first-quarter earnings, pretax earnings dropped 2.9%, for a fourth consecutive quarterly decline.

fourth consecutive quarterly decline. Earnings totaled \$681 million or \$1.17 per share compared with \$667 million or \$1.14 per share in the corresponding period last year.

Revenues advanced 8.5% and reached \$5.7 billion, up from \$5.2 billion in the same quarter a year ago. However, during fiscal 1979's first quarter, IBM's revenues grew by 19.5% over 1978's first quarter.

Overall decreased revenue growth is in part explained by users' continuing to prefer to rent and lease rather than purchase equipment. Analysts note that the high cost of money and continued speculation on IBM's new products have held the reins on purchases.

For the quarter, revenue derived from rentals and services grew 11.3% and revenue from purchases grew 4.2% from last year's first quarter. However, last year during the same quarter, IBM's purchases grew 38.7% and rentals and services grew 9.9% from 1978's first quarter.

Commenting on the results of the first quarter's performance, IBM Chairman Frank T. Cary noted earnings "continued to reflect the impact of inflation and the buildup of resources to meet customer demand."

Also during the quarter, IBM reported a \$30 million foreign currency exchange loss, but during the same quarter last year the firm reported a similar loss of \$38 million.

Cary noted that incoming orders for and shipments of DP equipment showed "small increases" from those in the year-ago quarter.

23.7% growth, outstripping the other auditor levels considered in the survey. DP audit programmers earned 14.2% more during the two-year period, while "staff" DP auditors and senior DP auditors had income boosts of 21.4% and 20.8%, respectively.

By the end of 1979, when Edpaa began to tally the 242 responses to its November questionnaire, the average DP audit manager was earning \$30,500 annually and had 4.5 years' experience in auditing and 4.8 years' experience in DP. The average assistant DP audit manager was earning \$27,800 annually with 3.1 years' experience in auditing and 3.8 years' experience in DP.

Average annual salaries for senior DP auditors, staff DP auditors, audit programmers and audit trainees were \$24,900, \$21,000, \$19,300 and \$16,700, respectively.

Industry Breakdown

In an industry-by-industry breakdown, Edpaa found DP auditors constitute a much smaller minorify among the DP staffs of manufacturing and insurance companies than among banks, merchants, utilities and the govern-

In the banking/finance area, the survey registered about eight applications programmers and about five programmer/analysts for every DP auditor.

But manufacturers have an average of 47 applications programmers and 17 programmer/analysts per DP auditor.

Insurance firms averaged 45 applications programmers and 32 programmer/analysts per DP auditor, while the ratio was 15:1 and 7:1, respectively, among public utilities.

among public utilities.

Schools showed 27 applications programmers and 24 programmer/analysts for each DP auditor, compared with 24 applications programmers and 14 programmer/analysts per auditor in the energy field.

Copies of the survey results are available for \$5 each from Edpaa's Administrative Offices, 7016 Edgebrook Lane, Hanover Park, Ill. 60103.



NCC to Focus on People as Well as Machines

CW Staff ANAHEIM, Calif. The National Computer Conference to be held here May 19-22 will offer attendees a lot of information about electronic equipment and applications, but it promises not to overlook the human element.

Ten regular sessions and four of the half- or full-day professional development seminars will focus on peoplerelated subjects ranging from Woman in Data Processing to "Packaging Your Image For

Dr. Donald Medley, NCC area chairman, has some compelling reasons for including sessions on people.

"Computers are affecting people really dramatically, more so than we give them credit for most of the time," he said. "Our entire life is coming under the control of computers and our attitudes about the things we do are be-ing shaped by the things that come from computers.

We have a tendency to depersonalize the computer environment to the point where people forget there is even a human element involved, he added.

'People' Program

In putting together a "peo-ple" program, Medley said that he considered two factors: "We wanted to put together a diversified program that would whet the appetite of the DP professional or the man-on-the-street, and we wanted to stress the usability of the computing tool

Service to Help NCC Attendees **Pinpoint Exhibits**

ANAHEIM, Calif. - Visitors at the National Computer Conference here May 19-22 will find it easier to get around with the help of the Compu-terized Personal Schedule (CPS).

The CPS, a creation of National CSS, Inc., will use a computer configuration to convenience convention-goers in two ways:

 It will provide listings of specific exhibits by category (e.g., disk drives) and location, including booth number and

· It will list technical ses sions by day, room number, time and speaker or session leader.

Soft-copy information will be provided by National CSS Vista 80 CRT terminals, while hard copy will be run off a Texas Instruments, Inc. 820

Located in the south lobby of the convention center, the CPS will be available for use as long as needed.

The "Women in DP Management" session will take a look at how women are working their way into management positions and what skills they have to offer. Spicing the discussion will be an adversary who will take the position that women have no place in DP management.

Packaging Your Image For Success" is a full-day professional development seminar that decries popular methods of evaluating performance, and tells how to climb the power ladder and get past peo-ple who stand in the way. The session has a special orientation for women, according to professional development seminar area chairman Jim Weiss.

Among the regular sessions, Computerized Production and the Worker: Three Views From the Shop Floor" is based on a paper submitted from a company in Sweden. It talks about the production worker and how he reacts with the DP center and the things it requires of him.

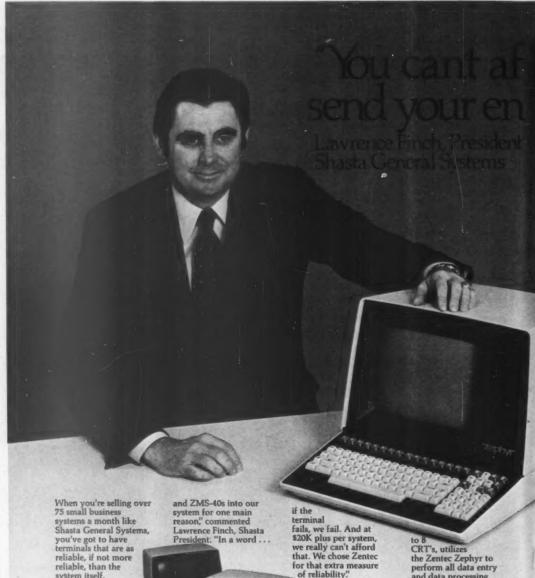
Production Control

The discussion will focus on production control systems, Medley said. "In production control systems, the worker on the floor reports the amount of time he works on a particular task and how many

items were completed, and that is then checked against a standard to see whether or not he worked up to or below the standard.

After the discussion, a panel will discuss pros and cons of the system.

More information on NCC may be obtained from the American Federation of Information Processing Societies, Inc. at 1815 N. Lynn St., Arlington, Va. 22209



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pendent distributor of small business systems in the United States, Shasta is a real stickler for quality. "We're incorfor quality. "We're incor-porating Zentec Zephyrs

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we're looking for quality. The CRT is the direct interface with our data processing and word processing applications. The customers. In their eyes, system, expandable up and data processing functions. Capitalizing on the Zephyr's intelligent features such as full cursor addressibility, full editing and protected forms modes, the Diablo 3200 system offers users improved system throughput. The ZMS-40s, incorporating custom keyboards and firmware are designed

Despite Objections of IDCMA

Tariff for Bell's Dataphone II Service Enacted

By Phil Hirsch

CW Washington Bureau WASHINGTON, D.C. — AT&T's controversial Dataphone II tariff became effective April 11, shortly after the Federal Communications Commission (FCC) turned down objections from independent modem manufacturers that offer competing systems.

The tariff encompasses a new line of microprocessorand large-scale integration (LSI)-equipped smart modems, plus a sophisticated network trouble-shooting service. Dataphone II was designed primarily for networks now utilizing Bell 201, 208, and/or 209 data sets or their equivalents.

The modem makers

through their trade association, the Independent Data Communications Manufacturers Association (IDCMA)—said the tariff should be rejected because AT&T had failed to justify the rates, had used a cost-allocation procedure previously rejected by the FCC and had premarketed the service.

The commission rejected all

these claims even though, in the midst of the controversy, AT&T announced that its original schedule for delivering Dataphone II hardware would slip up to four months. (IDCMA claimed the slippage was actually much greater than four months.) Therefore, even though the tariff is now effective, AT&T will not begin filling orders

until next July for some Dataphone II components. In the case of others, "scheduled availability," as Bell calls it, will not begin until next fall.

The company began marketing Dataphone II early last year, and Dataphone II tariffs have been effective within most states for several months.

Objections Rejected

In rejecting IDCMA's objections, the FCC said the association had failed to prove its case. For example, IDCMA allegedly failed to show that AT&T's Dataphone II costallocation methodology "possessed the same infirmities" as the scheme previously rejected by the commission.

Regarding the premarketing charge, the FCC said IDCMA had failed to show AT&T would be unable to meet "reasonable requests" for Dataphone II service. Nor does the slippage in delivery dates, standing alone, "indicate that AT&T is engaged in anticompetitive practices," the commission added.

An IDCMA spokesman said that before deciding whether to take further action, the association wants to see the full text of the FCC decision. It probably will become available early next month.

Dataphone II service includes four modems, a network controller and diagnostic console. The Model 2024 modem, which operates at 2,400 bit/sec, is priced at \$95/mo. It was designed for applications now employing the 201 data set (priced at \$59.55/mo).

The 2048A and 2048C (\$135/mo) operate at 4,800 bit/sec and were designed for installations now utilizing the 208 data set (also priced at \$135/mo). The 2048A has a 50 msec start-up time while the 2048C starts in 20 msec.

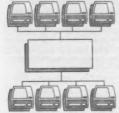
The fourth modem in the series is the 2096, priced at \$210/mo. It operates at 9,600 bit/sec and is a successor to the 209 data set (\$249/mo). The Dataphone II console costs \$125/mo and the network controller \$235/mo.

There are three levels of Dataphone II service. Level I includes a 2000 series control modem at the customer's computer center. This unit, linked to a single network having one or more remote terminals, polls the tributary units continuously in accordance with a polling list entered by the customer.

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handling all word processing functions. Word processing programs can now be downloaded to the terminal from the CPU and executed in firmware, relieving the CPU of valuable processing time. Together, they make powerful additions to an already powerful system.

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A Standout in Its Price Range

Wang 2200VP Benchmark Results Spectacular

By Hillel Segal

When it comes to sheer numbercrunching power, the Wang Laboratories Inc. 2200VP is definitely a standout system in the \$15,000 to \$25,000 price range.

Of 12 systems tested in that price group, the Wang computer was the

ACU User Comparisons

only one to capture first place in three of six categories during the benchmark testing program of the Association of Computer Users (ACU).

Just how fast is the system? The long version of the CPU-intensive test, which involves quite a bit of addition, multiplication and calculation of square roots and exponents, ran in just 14.2 sec on the 2200VP. That's almost

systems, for a starter. All the systems tested are suitable either for use as stand-alone computers or for communicating with other processors within a distributed network.

As you examine the results of the benchmarking program, you'll see, as ACU did when it published the reports, that most systems excel in certain types of performance but are slow in other categories. Some are great numbercrunchers but choke in the I/O routines; others whip data on and off disk but have difficulty with massive precision arithmetic problems.

Occasionally the ACU finds a system that's uniformly fast on all the tests. The Wang 2200VP came close. The association also uncovered a few apparent laggards — systems that grind out every problem at a snail's pace.

But don't get carried away with the assumption that benchmark results are the be-all and end-all in evaluating the ultimate desirability of a specific computer product. Benchmark tests are significant, but they should not be the

Scorebox

System: Wang 2200VP Current Price: \$16,500

Benchmark Results

		Time	Ranking
C-1	Scientific/- Engineering Problem	3 Min 6 Sec	1st
C-3	Accounts Receivable	3 Min 20 Sec	3rd

Other Benchmark Ranks*

Other Benefit	C-1	C-3
IBM 5110	8th	4th
Wang 2200VP	1st	3rd
Texas Instruments FS 990/10	To be	covered
Hewlett-Packard System 45	in futur	e issues

*Out of 12 systems tested in this series

This is the second in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000 member nonprofit organization.

nine times faster than the IBM 5110 discussed last week — which took 2 min 4.7 sec for the same run.

The Wang 2200VP benchmark, conducted for the ACU by an independent consulting firm, was one of 12 tests that examined various aspects of computer speed. By executing identical benchmark programs on different systems, one can draw some general conclusions about the relative performance of similarly priced commercial small computers. To standardize as much as possible, the benchmark programs are written in Basic and optimized where possible to enhance performance for each specific system.

Consider All Aspects

Last week this column presented extracts from ACU's report covering the IBM 5110. In future issues of Computerworld, we'll look at Hewlett-Packard, and Texas Instruments, Inc.

overriding consideration in selecting a

Factors such as ease of use, sales support, maintenance, documentation and compatibility with existing equipment are all at least as important as sheer speed. Don't overlook the direct comparison that benchmarking supplies but, at the same time, don't take it too far.

Disk Drive Interface

In looking at the test results of the Wang 2200VP, the ACU was impressed with its capabilities. However, a survey of owners of the system found that less sophisticated users ran into a few problems. By and large, they discovered only custom software could remedy the difficulties they encountered in handling the disk drive interface.

Under the Wang implementation of Basic (the only language offered on

this machine), diskettes are addressed by absolute sector rather than through automatic management of files. This extra programming burden was difficult for some users to shoulder themselves. It was perhaps because of the unusual I/O structure that Wang scored its only below-average result in the benchmark testing, an eighth place in the I/O-intensive benchmark.

The unusual disk access arrangement, though, did not seem to present a problem to experienced programmers. Some of them appreciated the added control offered by absolute disk addressing.

Among programmers themselves, in fact, the Wang 2200VP was perceived as having nearly all the desired features for a system in its price range. The keyboard sports 32 special function keys which may be software-defined, and the Basic interpreter offers a number of extended functions, all contained in read-only memory for faster access.

Programmers described Basic as "extremely powerful." The language is enhanced on the 2200VP with capabilities such as matrix operations, multiline instructions and multiple-instruction lines.

Minor Gripes

Still, like all computer users, Wang's were not without their share of minor gripes. Some said the keyboard's keys were like those of an old, manual type-writer — making typing uncomfortable after a few hours of work. Others said the printers broke down more often than expected.

Most troublesome of all seemed the rudimentary file management approach, forcing the business users that didn't have advanced in-house programming staffs to get help from outside.

Wang offers a selection of software packages, but doesn't get into the custom software business itself. The company provides customers with a list of about 400 software houses, which are approved and recommended for providing programming help to Wang customers.

Recent announcements concerning

the 2200VP (besides a price reduction) include the addition to the product line of a terminal with enhanced graphics capabilities and the inclusion of a fixed/removable hard disk drive with 27M, 54M or 80M bytes of memory.

All in all, the Wang 2200VP seemed to show in its benchmark results a special suitability for processing numerical calculations. Of course, this neither exhausts the list of its potential applications nor guarantees success within a particular DP environment.

With the availability of accurate comparisons through benchmark testing, we have an idea of a system's capabilities. But the remainder of the picture, including software, training and many other factors, remains to be supplied by teamwork between the vendor and the potential user.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

ACU's Series No. 1 reports on systems priced less than \$15,000. Series No. 2 covers the range from \$15,000 to \$25,000, and Series No. 3 tests systems priced between \$25,000 and \$50,000.

Series No. 2 includes benchmarks on the IBM 5110, Wang Laboratories, Inc. 2200VP, Texas Instruments, Inc. FS 990/10 and DS 990 Model 2, Hewlett-Packard Co. System 45 and 250, Datapoint Corp. 1170, Randal Data Systems, Inc. RDS-100, Digital Equipment Corp. PDP-11/03, Univac BC/7-610, QI Lite Microcomputer System and Northern Telecom/Sycor

Full reports on these benchmark tests, as well as information about the other benchmark series, are available from ACU. The entire Series No. 2 is available to members for \$150 (annual dues are \$25). More information is available from the association at P.O. Box 9003, Boulder, Co. 80301.



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Americans See DP Power As 'Big Brother': Goldwater

By Marcy Rosenberg CW Staff

PHOENIX - One out of every three Americans likens today's society to George Orwell's 1984 - "Big Brother is watching over our personal business and the computer explosion is respon-

CW at Database '80

Dealing that harsh blow to those who watch over the computer industry was Rep. Barry M. Goldwater Jr. (R-Calif.), who delivered a luncheon address on personal privacy in data bases at the IDMS User Association's Database '80 here last week.

Throwing out statistics as one might throw daggers, Goldwater quoted re-cent Harris Poll figures that show 54% of the people in this country believe the use of computers threatens their privacy.

"I'm not here to knock technology," he claimed. Instead, he called technology a "wonderful blessing" that has given the American people the tools to keep up with an advancing society.
Indeed, the demand for information

from government, insurance firms, the medical community and credit card issuers, to name a few — "has grown in leaps and bounds, and we look to in-dustry to provide the machinery to handle that data.

This, industry has done. According to Goldwater, of some 150,000 computers churning out data on individuals, banks alone process 8.5 billion pieces of information a year, making the U.S. "truly a data-based society.

But, he added, "Technology can be used to harm us and threaten our privacy if measures are not taken to prevent this.

Good Business Measure

Goldwater called on industry - not government - to take those measures. And even though he co-authored the Privacy Act of 1974 with New York Mayor Edward Koch, he declared, "We have more government than we need - or can afford."

Businesspeople, he continued, must realize that protecting confidentiality is good business. He encouraged the hardware and software industries to use the latest state-of-the-art technology to protect privacy. These vendors should tell customers not only what products will cost and what their money is buying, but also what controls and security devices can be used to protect information, he advised.

Unfortunately, "corporate America is not identifying just how important the processing business is," and DPers are given neither the importance nor the deserve, Goldwater salaries claimed.

What is needed, he continued, is a code of ethics, much like the Hippo-cratic Oath, to "relegate DP profes-sionals to a high level of visibility so

we can keep our eyes on you."
Goldwater acknowledged that the DP industry has no profit incentive for caring about privacy. The opposite motivation exists — that of cutting cor-

ners, and thus cutting costs, by remaining lax in the privacy area

However, he warned his audience of computer users and vendors that "If you don't do something about protecting privacy, you're inviting the government to do it for you . . . if that isn't incentive enough, I don't know what is.

The U.S. government is also making an effort to establish international standards for transborder data flow, an issue that if not resolved soon 'could erode our commercial competitive edge.

To back up this statement, Goldwater cited a French privacy law that prohibits sending data out of that country without first obtaining a license. According to the congressman, the next logical extension of such a law would be requiring that information not flow out of that country unless sent via French-made computers.

Calling the free flow of information "the grease that keeps our economy going," Goldwater said he doesn't object to a barter system - trading, for example, medical records for medical coverage or personnel records for a better job. But "the barter system has gotten out of kilter," he maintained. We are expected to give up personal information and waive all rights to control that information.

'We must bring the barter system back into a balance between clear-cut protection of personal information and society's obvious need to know.

Manual Updates Crime Jargon

By Jake Kirchner

CW Washington Bureau WASHINGTON, D.C. — With computer crime on the upswing, terms such as "data diddling," "Trojan such as "data diddling," "Trojan horse," "trap door," "superzapping" and "logic bombs" are becoming stan-dard entries in the law enforcement lexicon.

To assist investigators and prosecutors in handling computer-related crimes, the Justice Department has published a comprehensive, 400-page manual on computer crime.

The manual was prepared by SRI International of Menlo Park, Calif., under the direction of computer crime expert Donn Parker. It was written for law enforcement officials with little knowledge of computer technology, but is also meant to be an in-depth reference work for those with extensive technical knowledge.

To make the problem more understandable to prosecutors, the book is written in a form combining legal, technical and investigative concepts.

Those who do not know the difference between "salami techniques" stealing small, almost undetectable portions of computerized assets over a period of time — and "scavenging" —
obtaining data left in computer memories or DP centers, can obtain the
Computer Crime Criminal Justice Resource Manual (027-000-00870-4) for \$7.50 from the U.S. Government Printing Office, Washington, D.C.







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Carter Receives Conference Report

National Information Services Program Urged

By Jake Kirchner CW Washington Bureau

WASHINGTON, D.C. - A national library and information services program should be established to promote the application of technology to serve 'an information-hungry world,' cording to the final report of the White House Conference on Library and Information Services.

The report, delivered to President Carter late last month, called for a concerted campaign to enhance the use of computer and communications technology for the benefit of all citizens.

'As the amount of information expands and as people's need for it increases, science and technology are developing new and better ways to provide it, ranging from video cassettes and minicomputers to communications satellites and video disks," the report noted.

Major national goals developed during the White House conference last November [CW, Nov. 26] were to "reshape library and information services to serve the people in more useful ways, to maintain local control of these services and to insist on more economy and accountability from the institutions that provide the services."

The report reflects a feeling among conference delegates that information technology is becoming too valuable in the day-to-day life of the average U.S. citizen to remain under the control of an elite group of hardware manufac-turers and information managers.

Delegates made clear that they believed access to information is power and that in our democratic society the people themselves want to decide how to use that power," the report said.

To that end, the conference called for a Comprehensive National Library and Information Services Program to be supported by a federal National Library and Information Services Act to carry out the 64 final recommendations of the White House conference.

Program's Goals

The national program for socialized information would be directed by an assistant secretary for library and in-formation services in the new Department of Education. The office would oversee efforts to improve information services by promoting nationwide information networks and taking other steps spelled out by the conference

Additional recommendations for the proposed program were to:

Develop a national information policy that encourages interconnecting networks, fosters services to all states and territories and invites all telecommunications services to provide services to homes, businesses, agencies and libraries of all types.

· "Encourage cooperation among institutions for the efficient delivery of information technology, especially computer and communications technology in the exchange and delivery of information, and develop the necessary software packages to achieve these goals."

· Eliminate international barriers to information exchange and "encourage international data flows under appropriate guidelines.

· "Provide support for the development and adoption of national stan-dards." In this area "high priority" would be given to standards for hardware and software compatibility, computer and communications network protocols and machine-readable infor-

· Convene an international conference on library and information ser-

The program would support educa-tion and training in the field of information, strengthen community library and information services and develop nationwide networks for sharing information services resource

The proposed National Library and Information Services Act would establish the federal level organization to

pursue the program's goals.

Detailed sections of the proposed legislation address several issues: the most effective access to national library and information resources: access at the community level; access at the state level; provision of these services to Indians on or near reservations; and education and research needed to support provision of the services at all levels.

President Carter has until mid-June to submit to Congress his own recom-mendations based on the work of the White House conference. According to Conference Chairman Charles Benton, Carter's Domestic Affairs Adviser Stuart E. Eizenstat intends to appoint an interagency task force to study the recommendations in the final confer-



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Massachusetts Cancels MMIS Contract

By Ann Dooley CW Staff

BOSTON - Massachusetts has canceled a \$15 million contract for a Medicaid Management Information System (MMIS) from Pilgrim Health Applications, Inc., and state officials here are wondering what to do next.

The MMIS contract, which encountered problems from its inception, was canceled after Pilgrim - a subsidiary of Arthur D. Little, Inc. (ADL) failed to meet its deadlines.

Scheduled for start-up last September, the system was to have processed \$850 million in

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Group at IBM, Adin D. Falk-

here this fall.

Medicaid claims annually. But today, more than six months later, the system is far from implementation. Only the planning stage has been officially completed.

The delay is reportedly costing the state \$1 million a month in savings that would have been gained under the new system.

Problems From Beginning

Massachusetts' attempt at setting up an MMIS stirred up contract problems from its very beginning in 1977. The state originally awarded the MMIS contract to Blue Cross/

by I.P. Sharp Associated Ltd.

Registration costs \$155. More information and forms

can be obtained from Rosanne

Wild, Conference Coordina-

tor, I.P. Sharp Associates Ltd., 145 King St. West, Toronto, Ont. M5H 1J8, Canada.

I.P. Sharp Associates also announced that APL Press,

publisher of APL-related texts

and an APL newsletter, has

Blue Shield of Massachusetts for \$19.5 million with a sub-contract to Electronic Data Systems, Inc. (EDS) of Dallas. A dispute arose among other

bidders - Pilgrim among them - because of what they termed "unfair tactics" during the bidding process. Angry competitors contended the award did not go to the lowest bidder; the difference between the Pilgrim and Blue Cross bids was nearly \$5 million.

Moreover, Blue Cross/Blue Shield intended to use the BAL programming language instead of Cobol, which was specified by the request for proposal. Irate bidders also charged they were not given a fair hearing [CW, Aug. 1,

Succumbing to pressure, for-mer Gov. Michael Dukakis established a review board to examine the charges, a move that resulted in the contract offer being withdrawn [CW, Aug. 8, 1977]. A new selection committee was formed and, in March 1978, the contract was awarded to Pilgrim, the Lowell, Mass-based ADL subsidiary.

tract, Pilgrim was to plan, de-

velop and implement the MMIS for a fee of \$727,000. It was also to process the 18 million annual claims for three years at a charge to the state of 27 cents per claim.

Amicable Ending

In discussing the contract's termination, both sides were quick to point out it was an amicable agreement. Pilgrim admitted to the missed deadlines and has no plans to contest the decision. James Kirkpatrick, head of the state's MMIS Division, asserted that "no blame is being leveled and no fingerpointing is occurring."
Kirkpatrick said the contract

was canceled because "there was a concern at the state level that the project wouldn't reach a successful and timely conversion." The state took advantage of a contractual clause in the agreement through which it "could cancel at its convenience."

Massachusetts has so far paid Pilgrim only for completing the planning task, an amount of \$24,000. A system design and a conversion design had been submitted and a great deal of coding was completed, as well as various other tasks; but the system was only in the preliminary stages and is not far enough along that it can handed over to someone else to complete, Kirkpatrickstated.

Although neither Pilgrim nor state officials would say specifically why Pilgrim was unable to meet the deadlines, both indicated that the "scope of the work" had changed since the contract was agreed to originally. Neither would in-dicate which side had called for the changes in the system.

In upholding the validity of the contract choice, Kirkpatrick said, "The state had no reason to think that a company with the capabilities of Arthur D. Little would not fulfill the contract." A spokeswoman for ADL noted that additional money would have been needed for Pilgrim to meet its contractual obligations.

Massachusetts officials now find themselves more than two years behind in their Medicaid goals and are deciding what to do next.

Kirkpatrick said it will probably be several weeks or even months before a decision is reached on how to proceed. Rebidding might occur or the system might even be dropped, although he said that is unlikely.

moved from New York to Suite 201, 220 California off, will speak at the second Under the terms of the con-APL Users Meeting slated for Ave., Palo Alto, Calif. 94306. Oct. 6-8. It will be sponsored DataCommunications.

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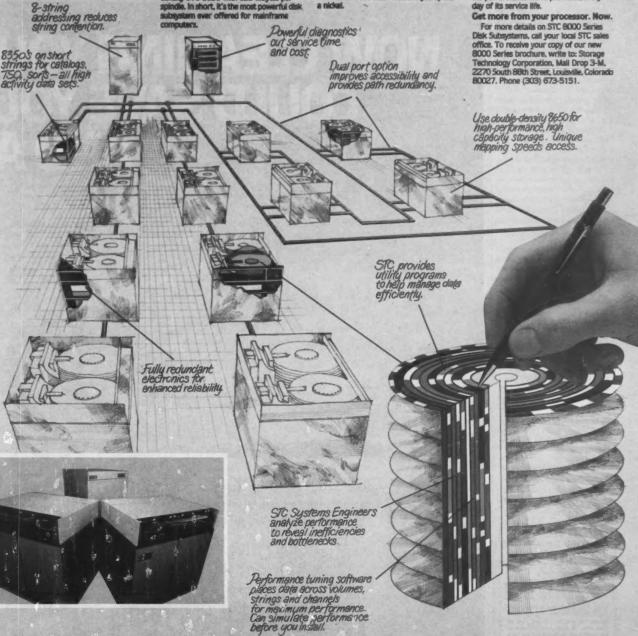
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Former Contu Chief Urges House To Adopt Software Copyright Act

By Jake Kirchner

CW Washington Bureau WASHINGTON, D.C. — Saying there is little if any opposition to copyright protection for computer programs and data bases, the former executive director of the Commission on New Technological Uses of Copyrighted Works (Contu) urged Congress to adopt the Computer Software Copyright Act of 1980.

Arthur J. Levine, a Washington attorney who directed Contu through the completion of its work two years ago, recently told a House of Representatives Judiciary subcommittee that he knew of "no organized opposition" to the copyright legislation.

The Judiciary Subcommittee on Courts, Civil Liberties and the Administration of Justice is in the middle of hearings on H.R. 6934, introduced by Subcommittee Chairman Robert Kastenmeier (D-Wis.)

The bill, embodying the final Contu recommendations, reaffirms the copyrightability of programs and data bases under federal law [CW, April 7].

Amendment's Objectives

As read by Levine, the legislation accomplishes the Contuobjectives of amending the 1976 Copyright Act to:

 "Make explicit that computer programs, to the extent that they embody an author's original creation, are a proper subject matter of copyright."

 "Apply to all computer uses of copyrighted programs."

 "Ensure that rightful possessors of copies of computer programs be allowed to use or adapt the copies for their use."

In sum, Levine said, "this bill makes explicit in [the copyright law] that which is implicit" now.

Patent Protection

Asked by Kastenmeier about Contu's consideration of patent protection for software,

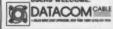
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the former director replied that the question "was always on the fringes" of Contu's discussions.

The Supreme Court "has not closed the door on software patents, but there is not much room to squeeze inside," Levine said. He noted that Contu recommended that copyright not be the "exclusive method" of software pro-

tection

Levine said the Kastenmeier bill is in the public interest. Although there were three dissenting opinions among Contu members about the commission's final recommendations, "there was not any substantial opposition" to software copyrights found during Contu's investigation, he said.

Cassette Discusses 8100

OAKBROOK, Ill. — Users of the IBM 8100 may be interested in a series of management briefing programs on that system developed by Charles P. Lecht and Deltak, Inc., a producer of training and information programs.

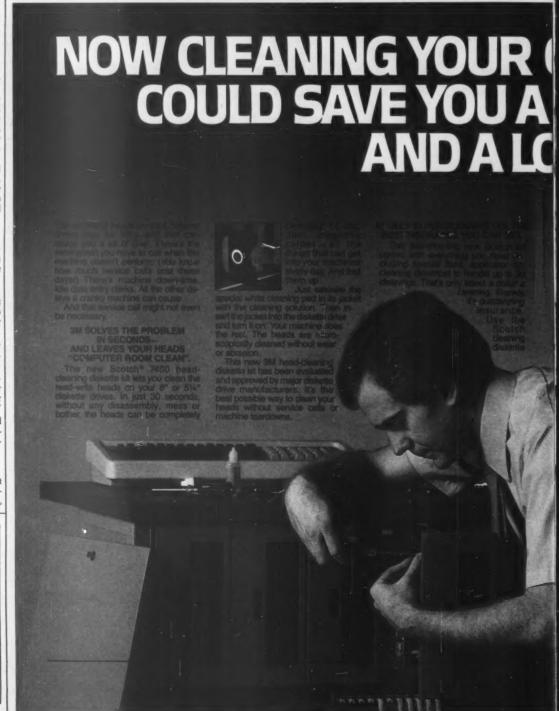
Inc., a producer of training and information programs.

Three programs in the form of video cassettes discuss IBM's philosophy behind the design of the 8100, how the system is positioned in the market and how the system can best be used by an organization.

best be used by an organization.

Lecht, president of Advanced Computer Techniques
Corp. and author of Weves of Change and Tsunami, will
also collaborate with Deltak on a series of five courses
teaching applications design for the 8100.

Rental prices for the briefing course are available from Deltak, 1220 Kensington Road, Oak Brook, Ill. 60521.



Mushrooming Data Trails

Data Base Prescribed as Cure for 'Datamania'

By Marcy Rosenberg CW Staff

NEW YORK - The data base environment offers the only cure to datamania - a condition that is reaching epi-demic proportions in this country.

But to work for what is needed in the data base environment to keep us from becoming slaves to our own machines, communication must continue to flow openly among users, vendors and the thinkers in universities, according to Dr. Carl Hammer, director of computer science for Univac.

Addressing a luncheon at the Second Association for Computing Machinery (ACM) Greater New York Regional Conference, Hammer presented evidence of what he termed "data pollution" on our shores.

The data trail created by ach individual is enormous, he lamented, noting that today about 1 million bytes of data are processed per person each

Moreover, the U.S. passes some 100,000 laws yearly, averaging out to one new law

every five minutes, he added.

Do we really need all of this lata? Yes, Hammer maindata? tained. "We've made our society so complex that we've boxed ourselves in - collection of data has become a necessary evil."

Assuming it is necessary, then why evil? According to Hammer, mushrooming requirements for data gathering and processing have given way to social problems and technological concerns.

On the social side, it has become necessary to establish legitimate needs for collecting huge amounts of data and for safeguarding this information. But there lurks a "Catch-22, he observed. "As more laws are passed to protect privacy of data, more data is collected to ensure the privacy of data.

Technological Problems

Technological problems also come to the fore. Our technology-driven society is turning out hardware that is more reliable and cheaper each year. But hardware accounts for a mere 10% of the cost of a system during its life cycle.

Software, on the other hand, "is not always reliable," but makes up, along with "people costs," the other 90% of systems costs, Hammer noted.

Hammer does see a silver lining hiding in this cloud. An "open society" provides incentives for good technical work, productivity and creativity. But only as long as we continue to talk to each other - discuss our software problems with other users and with vendors - can we make progress," he remarked.

Solutions vs. Growth

Solutions to today's problems, however, will not keep pace with the exponential growth of our society and its information demands. Why? Because it was "brainware" people, not computers - that produced bigger and better processors and chips.

Hammer predicted, therefore, that future developments will be evolutionary through product enhancements - rather than revolutionary.

So the good news is, "your jobs in DP are safe"; the bad news is "the next 20 years will be as fraught with headaches, turmoil and problems as the last two decades," he said.

He urged the audience to "take a real hard look at what kinds of services we need in society and develop data base management systems to perform those services and then you can say the job you save may truly be your own.

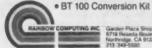




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May 12-14, New York -Fighting Computer Crime. Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

May 12-14, San Francisco -Management for New First-Line Women Supervisors and Assistants. Administrative Contact: American Manage ment Associations, 135 W. 50 St., New York, N.Y. 10020.

May 12-14, Toronto - Session 80 Canadian Information Processing Conference. Contact: Canadian Information Processing Society, 243 College St., Fifth Floor, Toronto, Ont. M5T 2Y1, Canada.

May 12-14, New York - Establishing the Word Process-ing Center. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

May 12-14, San Francisco – DP Project Management: A

Practical Approach. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 12-14, San Francisco -Computer Performance Measurement: Tools and Techniques for Increased System Productivity. Contact: Data-pro Research Corp., 1805 Un-derwood Blvd., Delran, N.J.

May 12-14, Denver - Effective Computer Operations Management. Contact: Datapro Research Corp., 1805 Un-derwood Blvd., Delran, N.J.

May 12-15, Ft. Lauderdale, Fla. - Ninth Annual Computer Audit Retrieval Systems (Cars). Contact: L.J. Ullrich Jr., Maryland National Bank, 321 Fallsway, Baltimore, Md. 21202.

May 12-16, Philadelphia -Systems Design Workshop. Contact: Q.E.D. Information Sciences, Inc., 141 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

May 12-16, Washington, D.C. - Systems Analysis Workshop. Contact: Brandon System Institute, Inc., 4720 Montgomery Lane, Bethesda, Md. 20034. Also being held May 19-23 in Detroit.

May 12-16, Montreal – Standard Costing for Capacity Management. Contact: Institute for Software Engineering, P.O. Box 637, Palo Alto, Calif. 94302.

May 13-15, Boston Electro/80 Show and Convention. Contact: Electronic Conventions, Inc., 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

May 13-15, Dallas - Management Needs of DP Professionals. Contact: Ubi Enterprises, 30 Milbank A Greenwich, Conn. 06830. Ave.,

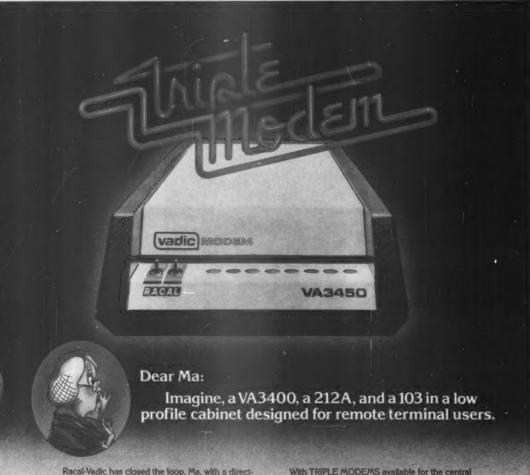
May 14-17, Houston - Integrated Project Management. Contact: On-Line Systems, Inc., 40 Washington St., Wellesley, Mass. 02181.

May 15, Washington, D.C. - IMS Dump Reading. Contact: Data Base Management, Inc., 281 Hartford Tnpk. Vernon, Conn. 06066.

May 16-17, Cincinnati, Ohio - Key to Survival in the '80s, sponsored by the Data Processing Management Association Region 10. Contact: Robert McKenna, Monsanto Re-search Corp., P.O. Box 32-Miamiburgh, Ohio 05435. 45342.

May 17-18, Los Angeles -Pascal: An Introduction to Methodical Programming. Contact: Computer Science Education Extension, 9125 Fall River Lane, Potomac, Md. 20854.

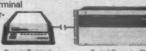
May 19-21, Boston Disaster Recovery Workshop. Contact: EDP Security, Inc., 400-2 Totten Pond Road, Waltham, Mass. 02154.



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manufacturers are incorporating VA3400 modems into their new equipment.



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The Team Concept — Inefficient?

Our DP department has 60 analyst/programmers, and we are organized into teams covering each functional area. I am a project leader and manage one of the team

Ever since we went to the team concept, the company philosophy has been that you work on one team at a time. Consequently, everyone has a relatively permanent team assignment. As you would expect, the work load of teams varies considerably throughout

I'm a little upset now. In the next two or three months, everyone on our team will be working overtime, and we're still falling behind. As I walked through the office yesterday, I noticed five or six analyst/programmers read-ing newspapers or talking about last night's game.

Our management knows that work loads at any given point in time vary tremendously among functional teams, but seem content with the present arrangement. Do other similarly organized DP departments experience the same inefficiency in resource utilization?

You're certainly not the only one, but that doesn't make it right. There is very little justification for management's inflexibility in its philosophy.

This type of organizational structure is better suited for much larger computing centers, where each team may be working on several major projects at once. Your department is probably too small to restrict a person to one functional area.

I'm a fan of having DP professionals assigned to more than one project (not necessarily all systems development projects). This approach has several advantages.

In any project there are wait states (program output, user signoff, etc.) during which progress can be made on an alternative project. Assignment to several projects cannot only be more exciting, but provide a better exposure for professional development.

If you or one of your concerned col-leagues is in a position to make suggestions, you might recommend that each professional person maintain an hourly activity log with five to 10 preset categories. After several months, a summarization of the logs would highlight missed opportunities for a more

efficient use of personnel.

Nobody in the DP business wants to sit on his thumbs. DP management has a responsibility to its subordinates and to the company to ensure that this does not happen.

Concerning your answer to the question "What to do about a poor speaker?", I would like to suggest Toastmasters, an organization whose primary purpose is helping people become effective speakers.

The cost is minimal and the opportunities maximal. A good book comes with being a member. This book progressively leads you through 15 speeches, working on organization, then gestures, then vocal variety, etc.

Membership also means 15 to 20 friends who are becoming skilled speakers and can provide advice and feedback on the spot. Gaining confi-

dence comes from the practice of having given those 15 speeches and being given your Competent Toastmaster

A number of Computerworld readers responded with a suggestion to recommend Toastmasters. Anyone who has seen the before and after presentations of Toastmasters alumni would agree. A good sugges-

I work in a typical DP shop as a programmer/analyst and have been exploring other employ-ment opportunities. I've been offered a job as an analyst for a company that manufactures its own special-purpose computers. Not only is the hardware unique, but so is the high-level programming language used.

The job offer is very attractive, but would I be locking myself into a specialized, narrow field? If this job doesn't work out, will I be able to get back into the mainstream of data processing?

Surely you should be able to determine whether you like the job within two years. If anything, I expect the demand for experienced programmer/analysts to be even greater in two years. After a few months of review, you should have no trouble transitioning back to data processing, if you so desire.

Approach your new position with



vigor, not with the idea of eventually returning to DP. If it doesn't work out after a sincere effort, you know you have another option.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass.01701.

Long is a professor at Lehigh University, a DP consultant and author.

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EDITORIAL

FCC's 'Final' Decision

Although the Federal Communications Commission (FCC) has issued a "final" decision in the Second Computer Inquiry [CW, April 14], it is almost certainly not the last word on the subject.

The Computer Communications Industry Association has already said it will take the decision to court, while AT&T and General Telephone and Electronics Corp. (GTE) may very well do likewise.

One key issue underlying the FCC decision - as well as the current congressional debate over the rewrite of the Communications Act of 1934 (H.R. 6121) - is how to restructure AT&T. The goal is to let the telephone company offer data processing and other competitive services on a deregulated basis but under restrictions that would prevent Bell from using its vast resources to monopolize these markets.

The FCC decision attempts to satisfy both of these objectives by requiring AT&T to offer competitive services through fully separated subsidiaries - and H.R. 6121 takes the same basic approach. The problem is that vendors of on-line computerbased services and systems do not believe these restrictions go far enough, while the carriers insist they go too far.

Another controversy involves AT&T's 1956 Consent Decree - specifically, whether "enhanced" (i.e., computer-based) online information services are "incidental to" those AT&T has been providing for many years. If this is the case, as the FCC contends, the phone company can offer enhanced services without violating the decree.

The underlying issue here is not so much whether the commission's thesis is correct; but whether it can apply the decree to services which did not exist in 1956.

Most computer industry participants in the FCC's inquiry, as well as the Department of Justice, believe this question must be decided by the U.S. District Court in New Jersey, which is the legal administrator of the decree and the primary interpreter of what it means.

If the Justice Department asks the New Jersey court to decide whether the FCC decision violates the decree, it will further delay the introduction of many enhanced services.

However, since the decree applies only to AT&T, the action could conceivably give other carriers such as GTE and Continental Telephone Co. an exclusive opportunity to move forward quickly in these areas.

How Serious?

One has to question how serious IBM is about settling the U.S. vs. IBM antitrust lawsuit: Last week its public relations office said the talks were stalled because the Justice Department had put a "public precondition" on the settlement.

The glaring problem is that what IBM now calls a "public precondition" - that the government wants divestiture - has been officially known since 1972, when the government submitted its relief statement.

Just as intransigently, IBM has said it will never agree to any kind of divestiture and argues that keeping IBM whole is in the national interest.

IBM says it wants Sanford Litvack, the new head of the Justice Department's Antitrust Division, to withdraw his call for divestiture, which IBM claims changes the nature of the talks.

The other problem is that this stalemate comes after five meetings since last October devoted to procedural questions of how the talks would be handled. Apparently no substantive questions have been broached.

The fact IBM is willing to pull out without even touching on the substantive matters causes one to question whether it is acting in good faith.

If not, that is truly unfortunate. Millions of tax dollars are involved and settlement rumors continue to play havoc with the already shaky stock market.



LETTERS

A Bum Rap

When I got to the end of "Insurer Errs by \$1 Million" [CW, April 7], I started to laugh. After everyone in my department had read the article, we decided that a letter was necessary.

Poor old Equitable Life Insurance Co. paid out too much money because some lowly data entry employee made a mistake. To this we all say "horse hocky" and various other barnyard fe-

Why do Equitable Life and many other companies blame data entry for all the errors? Because they probably have no internal controls, audit procedures and or balancing totals.

All you upper management people that think data entry is the weakest link in your information processing chain should take another look at how your data is processed. Mistakes that go uncorrected for two and a half years are not the fault of data entry.

Check out your paper flow. If you

have \$1,000 in benefit claims going in, you should have \$1,000 in benefit checks coming out. Seems easy to me.

My advice to Equitable's data entry people, and all other data entry people everywhere, is to buy life insurance from Equitable and name yourself as the beneficiary and your occupation as Middlesex, N.J.

data entry operator. After you get your policy, notify them that you died and you would like your benefits paid.

Perhaps then Equitable can find its weakest link.

David A. Biles

Cheneyville, LA.

Too Secretive

Regarding "Copyrights, Trade Secret Clauses: Use Both" [CW, March 31], please note that the biggest trade secrets seem to be those regarding the documentation necessary to utilizing canned programs.

We have purchased a turnkey computer system from one large Fortune 500 company. It was delivered last August and to date we still cannot find out what purchase order form we should be using with the system. The vendor doesn't know. It doesn't know

how the payroll program operates. Programmers and systems people change jobs so fast that the vendor can't get the documentation from the people who did the work.

The computer world today is functioning on about the same level as television companies in 1950 and used-car dealers since the beginning of time. R. Eno

DATA PAST

Five Years Ago April 16, 1975

NEW YORK - The advent of microprocessors may well signal the demise of the computer room as it is known today, Earl C. Joseph, a technology forecaster for Univac, said here. The use of microcomputers will allow users to place more software functions into hardware and will also allow computing power to be more widely dispersed throughout an organization, Joseph told attendees at the IEEE Computer Society's Intercon '75.

Eight Years Ago April 12, 1972

LOUISVILLE, Colo. - Storage Technology Corp. introduced a series' of IBM-compatible magnetic tape systems that could read and write standard magnetic tape at a recording density of 3.200 bit/in. - twice the density offered by any other company



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THE TAYLOR REPORT/Alan Taylor

Cobol Compiler Gives Language a Boost

Cobol, the language that many developers thought was washed up, has gotten a boost from a new, uniquely independent and portable standard Cobol compiler for 64K microcomputers from a four-year-old British firm called Micro Focus.

And, with the growing realism of the U.S. government Cobol tester since their reorganization, the effective use of the language for commercial program development by integrators, manufacturers, and users themselves seems stronger than ever before.

The Micro Focus Cobol was designed without any tie to hardware. It isn't an IBM Series/1 Cobol, or a Burroughs Corp. Cobol or anything like that. It is a micro-system Cobol, so it doesn't have tape or card facilities and currently is presented in dedicated form—

but the design is totally hardwareindependent. Versions exist for many different chips.

No Retraining

In addition, the Micro Focus product capabilities are not dependent upon programmers having to be retrained in a particular near-Cobol dialect. "It handled everything we threw at it," the federal testers told me. And that is important in protecting the user's ability to confidently plan to move people and applications in the coming years without worrying about dialect conversions. This is very important commercially as converting between different dialects has been a barrier almost as effective as converting to different hardware or to different standards.

This allowance for conversionfreedom is not accidental. The developers built the capability right into the system through the use of three design features and by writing the compiler itself in Cobol, using Cobol programmers.

The three features concerned are:

 A standard intermediate language that uses about eight bytes per Cobol statement.

 A standard interface between the intermediate language to any operating system, for I/O handling and so forth.
 For each particular version, a special assembly code module is written to support the standard I/O interface.

• A separate assembly-language module connecting the machine code with the primitives of the intermediate language, again through a standardized interface.

Technically, the features make a simple but effective architecture. The style is certain to be copied and further developed by many software houses around the world. Micro Focus currently has the lead, of course, but in the larger scheme of things, this development belongs to everyone.

Potential Customers

Mere technical virtuosity, however, means little without some economic basis; and in the few months that the system has been around, it has won International Computer Progams, Inc.'s Million-Dollar Award.

In this new world, with the compiler able to run on totally different types of machines, the marketing patterns must change. Machine manufacturers keep their place as compiler buyers, both for resale and for their own development, but now must face outside competition. The user is no longer in a take-it-or-leave-it position.

Micro Focus (whose U.S. headquarters is in Santa Clara, Calif.) is doing rather well in its sales campaign, now getting the Texas Instruments, Inc. contract. But there is plenty of room for other competitors. The new market for Cobol compilers includes computer manufacturers and even end users who may not want the particular com-

(Continued on Page 29)

HUMAN CONNECTION/Jack Stone

Second-Class Image Hurts DPers

Have you recently contrasted the average salaries of DP directors with those of "comparable" positions of responsibility? Well, try it, because I did and I was shocked. These directors are given a beggar's pittance relative to their contributions and those of their peers — at least by my reckoning.

Although the DP directors I've talked with lately were tight-lipped about salary differentials, I couldn't help wondering if this salary disparity, plus the second-class position of the DP function in most organizations, hasn't been the root of the considerable dissatisfaction that I think is fermenting among these people. And I would suspect this dissatisfaction seeps slowly down through the organization and has to affect the mental states of the employers.

Come to think of it, I don't recall meeting a single DP manager recently, with a medium-to-large-scale mainframe installation, who has described his job as anything other than a dreary grind — or something similar. Do you?

On Right Track

One reader, John Callahan, believes strongly that DP should be elevated in the organization. Although he goes overboard a bit in his arguments, he's certainly on the right track.

"I am glad to learn from your recent columns that you are speaking out in support of upgrading the DP function to the vice-presidential level, on a par with other major functions of a corporation. You are a voice crying out in the wilderness, I am sure, but at least yours is a voice where none existed before.

"You know such change will not be effected without a heavy struggle at the executive level. Many excuses will be found by executive management to maintain the status quo, and there will be heated battles for such organizational upgrading. It is all too sad that at this late date — DP is 25 years young now — so few firms have made such an upgrade.

So long as DP is looked upon as just

a 'service' function, an overhead 'drag' whose funds can readily be cut to improve profits, DP will remain a corporate dead end department where the highest career level is that of a director and DPers are nothing more than technology 'resources,' destined never to fill senior management positions and responsibilities.

'Revolving Door'

"For those who desire to advance into management jobs, it is usually necessary for them to leave their current organizations and find such positions in other firms. This situation encourages a constant 'revolving-door' atmosphere until such time that age-prejudice barriers begin to affect one's career path effoxis.

"It is simple to prove to any executive management that DP is not only a service function — simply have the DP department shut down for a month. If the resultant chaos does not awaken senior management, extend the shutdown into a second month. At that point, the company's operations will have come to a complete halt.

"Indeed, such hard lessons would prove that DP is a vital life function, because these days, few - very few firms can survive if the data information flow is stopped. Even if senior management does not want to face up to it, the fact is that DP has become a major function, one on which the corporation's very existence depends. Yet most executives still refuse to recognize and accept this fact by their refusal to upgrade DP to that of a vice-presidential function. And this refusal dampens the perceptions of DP as a long-term career field. Yet these same executives cry that there are no 'qualified' DP people to fill management positions! No wonder!

"I fully support your views on this issue. The change is sorely needed and quickly — without another decade of foot-dragging passing by. I hope your articles light some fires in senior management ranks and help cause these changes to come to pass. More and

more, DP will play an even greater role in protecting the viability of the corporate entity — it is high time that it is placed at the proper level.

"Keep plugging for this needed upgrade of the DP organization!"

COMMENTARY/Connie Winkler

U.S. vs. IBM Must Settle Relief Issue

The U.S. vs. IBM trial is in the final stretch — probably the toughest yards. But to IBM users, competitors, stockholders and U.S. taxpayers, this is the most crucial stretch.

Both sides have to decide how to finish the five-year-long trial. The crux is the relief issue — if IBM is found to be a monopoly, and the trial judge orders divestiture, how is it to be done? How could IBM be prevented from exercising monopoly power in the future?

The Justice Department says it wants structural relief — breaking up the giant — but that it wants to hold off on the specifics until IBM is found guilty. IBM, of course, contends it's innocent, but if the relief issue must be covered, IBM wants it covered now.

Unfortunately, the question of relief has not been addressed much during the five years District Court Judge David N. Edelstein, now 70, has been hearing the case. The issue has boiled down to whether there will be a two-part, or bifurcated, trial in which liability (guilt/innocence) would be considered separately from the relief question, or whether the present trial will consider both liability and relief.

The Justice Department wants a bifurcated action "in the public interest." IBM wants the actions com-

bined - which they have been so far.

IBM's all-consuming interest here is that if the trial adjourns on liability and the corporation is subsequently found guilty of antitrust violations, then it will be bombarded with private lawsuits. Indeed, based on Edelstein's rulings to date, IBM has reason to worry.

After 10 years of private lawsuits which have tossed IBM's lead counsel Thomas D. Barr from courtroom to courtroom, Barr does not want another round of expensive private suites. But the private suits are very attractive to possible plaintiffs because the winners would be eligible for triple damages.

Edelstein will ultimately decide whether there will be a single or bifurcated trial. "My mind is completely open," he said at a recent chambers conference. "I have not at the moment seized upon any plan, any procedure or any definition."

Barr objects to adjourning at this point pending a liability ruling because it will be difficult to get things rolling afterwards. One of Barr's longstanding jabs has been that the government trial staff keeps changing and thus is not familiar with the complicated case.

(Continued on Page 26)

Relief Issue Hovering Over U.S. vs. IBM

(Continued from Page 25)

Chief of the Justice Department trial team, Robert J. Staal, say it's in the public interest to get a ruling on liability now. "There indeed has been substantial pressure . . . to end the case or at least to meet a meaningful interim decision point," Staal said at the chambers conference.

Diving into relief questions now would only draw out the coming rebuttal part of the trial when both sides get a last chance to debunk what the other side has said over the last five years, the government says. The rebuttal is expected to immediately follow the trial, which now has at the most four IBM witnesses to hear.

Staal argues that delving into the relief question now means IBM's rebut-

tal round, what Staal calls surrebuttal, could be lengthy, thus dragging the trial out longer. Barr has acknowledged the surrebuttal would have to look at such issues as tax questions international ramifications of breaking up the multinational corporation. But, Barr says, this won't take

What Next?

All this makes for much confusion

over what will happen next. It appears the Justice Department doesn't know what it wants on relief. But perhaps the complexity of the government's dilemma could be un-derstood by any user who has been sweet-talked by IBM typewriter salesmen, small computer salesmen, large computer salesmen, field engineers and other representatives of the firm's various divisions.

How does one go about dismem-bering the giant? Would two companies make any difference in the marketplace? Three? Four? Five? Splitting IBM into four vertical companies, for instance, still leaves any one of the four larger than IBM's nearest compet-

The government has been additionhamstrung because IBM has fought handing over internal documents which would shed light on divestiture problems.

The point, however, is that avoiding the problem now does not make it any easier to solve in the long run. The Justice Department has been hemming and hawing too long. In 1972 it issued a general statement saying it would seek structural relief. Although the government rested its case in 1978, no witnesses testifed on relief issues. In January 1979, Justice set up a commit-tee to study the relief question and asked Edelstein to order IBM to produce relevant documents. Staal has since asked that the relief motion be postponed.

Delaying the relief consideration can only exaggerate an already painful and increasingly ugly trial situation. In the interest of the taxpayers, innovative solutions to the relief issue must be

considered.

Judge Edelstein has been much criticized for not taking a firmer hand in the trial. Up until now, his hands have often been tied, but the relief issue is an opportunity for Edelstein to lay down strict rules on how relief questions will be aired.

Now is the time to consider bringing in a magistrate or another judge to study the web of IBM plants, products and people to propose how those can best be structured in the interest of the American people.

Everyone involved with the trial must now exert that final burst of energy at the finish line and start grappling with the relief questions.

Winkler is a CW staff writer who has been reporting on the trial.

A Better Portrayal

The editorial cartoon in the March 24 issue was one of the best I've seen. However, it was a bit false in its portrayal.

A more accurate picture would have shown Fay Wray being held and pro-tected in the giant's hand, representing how AT&T looks out for the public interest. This more accurate presentation would also place a more realistic connotation on the emotion shown by the competition — a sweated frenzy and worry over how more widespread competition will prevent them from "gouging" the public with unfair

Gary A. Whitney

Reading, Mass.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

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DP Dialogue

Notes and observations from IBM that may prove of interest to data processing professionals

Quicker Shipment: Distributed Processing Shortens Customer Order Cycle

Through the use of distributed process-ing. Arteraft Concepts, a division of H. Stuart Inc., has shortened the customer order cycle from three days to two, resulting nding reduction in receivin a correct

Arteraft designs, manufactures and markets craft projects including in-the-home needlepoint, rug hooking, weaving, crewel and stained glass.

Customer orders for Arteraft are writ-ten by field representatives called coun-selors and mailed to Ballston Spa. There, operators key the data into terminals online to the \$100.

ters in Newark, New York.

According to Robert G. Boss, vice president of management services, Arteraft has been the Stuart pilot division for distributed data processing. Today, or-der entry for Arteraft is performed on an

IBM 8100 Information System at the IBM 9100 Internation System at the division's headquarters in Ballston Spa, New York. Formerly, all order entry for Stuart, a world leader in direct-consumer marketing, was handled in a computer center in the Stuart headquar-

The people who process the orders intimately familiar with the product are intin line, so they can answer most questions immediately," Boss points out.

Previously, he explains, couriers brought the order forms 200 miles to Newark for processing, and brought the

Stained glass and needlework are a the craft projects available from Artcraft Concepts. The C. H. Stuart division uses distributed data processing to cut both the time and the cost of customer order shipping documents back to Arteraft. This remains the standard procedure for other Stuart subsidiaries which make and mar-

The division now has complete control over its own data entry, its own priori-ties," Boss notes. "But control of data processing implementation is retained at corporate - there are no programmers at the division location. By keeping the expertise here, we can bring the techniques developed for one division to the others, and act as a catalyst for DP development

throughout the company."

Today, the corporate computer queries Arteraft's 8100 to pick up the order data, which it needs for inventory control and sales analysis. And it batch transmits shipping and payment data back to the 8100, which prints the shipping documents and commission checks for the counselors.

We avoid the delays, the costs of the courier, the extra handling, and the vul-nerability to snow," he says. "And we pro-tect the integrity of our operations: the original written order never leaves Ball-ston Spa. We installed the 8106 ourselves. We had it running -operating system and application programs - in two eight-hour days."

OBE Lets Cumberland Farms Ask the Right Ouestions

Cumberland Farms is growing fast in a very competitive business: food retailing. An IBM computer program called Query-by-Example (QBE) is one of the weapons mobilized by Cumberland in the neverending struggle to control costs.

If a declining sales trend sets in at any one of the company's 1,102 retail stores, or if a store inventory begins to drift out of line, with the aid of QBE management can note and react to the development more quickly.

more quickly.

QBE takes advantage of material al-ready in the company's IBM System/370 Model 158 computer in Canton, Massa-chusetts. The files for Cumberland's basic data processing operations contain all the data needed for this kind of analysis. As Frank Alger, executive vice president, explains, the challenge is to identify the crucial data, and organize and present it so that the significant trends are apparent.

"Often, the user doesn't really know what he needs at first," Alger says. "He finds out by experiment, by 'playing' with the system, in a sense. For example, he can ask for a listing of all stores that have experienced sales declines for five weeks or more in a row. If this doesn't give him enough data, he can try four weeks in a row, or four weeks out of five, or limit the analysis to one geographic area, or tabu-late sales by individual product lines. "He can experiment with different for-

mats of the data until he finds one that clearly brings out the pattern he is looking for. A major benefit has been to eliminate many of the bulky reports the computer used to generate every week or month." Managers in user departments can or-ganize reports to suit their needs. A security department executive, for example, might ask for all past store assignments of an individual. Or an inventory manager

can analyze sales against weeks of inven-tory on hand, to find stores with excessive

"The language of QBE is simple and uncomplicated," Alger says. "Every de-

partment head knows how to operate the system, is exploring its capabilities, and is very interested. It gives us what we want to know, when we want it and in the form we want. The possibilities are unlimited."



Cumberland Farms operates 1,102 retail food stores in the Eastern U.S., as well as a number of food processing plants and 400 gasoline stations. With IBM's QBE, Cumberland Farms management can spot trends fast, and solve problems while they are small.

Well-Designed Systems

J. O'Connor's commentary regarding the implementation of successful systems failed to focus on the real reasons that ensure a high success ratio [CW, March 31]. The author's points were well taken; however, they are not decisive but, rather, outcomes of well-designed systems. The issue would be better determined if standards for systems development were considered.

Industries have recognized the value of standards, and we see them represented in manufacturing, accounting and engineering. Lately, in our in-dustry, similar methodologies are being established.

As our designs become increasingly more complicated, the requirement to eliminate, or neutralize, the "failure traits" demonstrates the need to design systems according to established methods and procedures. Systems development standards provide the framework through which the implementation of systems will be achieved successfully, on time and within budget.

Arthur Levine Oak Brook, Ill.

Acronyms in CW

Computerworld has a style quirk which we and our member companies find confusing and inconsistent - that is, your insistence on using an upper case acronym for some organizations and a mostly lower case acronym for others, such as the Computer and Business Équipment Manufacturers (Cbema).

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LARKS ELECTRONICS & DATA

LETTERS

I am certain that virtually none of your readers understand the reason for this rule. Consequently, most of them are puzzled by it, particularly when two organizations - one in caps and one not — are mentioned in the same story.

Does a cap followed by a lower case acronym mean that the lower case organization is less important than the all-caps organization? I don't think CW intended it that way, and yet that is one possible interpretation in the absence of an explanation to your readers.

Jeffrey T. Wood Director of Communications Computer and Business **Equipment Manufacturers** Association Washington, D.C.

CW's style is to capitalize any acronym greater than three letters that cannot be pronounced as a single word. If an acronym of four or more letters can be pronounced as a single word, we've found that DPers generally do - so we capitalize only the first letter. Ed.

Planning a Failure

People planning to take the Certificate in Data Processing

(CDP) "semicold" exam Time, CW, Turnaround March 10], should also plan on getting semicold failing scores. That way they can tell themselves and their associ-ates that they didn't really

plan on passing anyway.

It has been my experience
that very few people, even
those with extensive experience and formal education, will have a "snowball's" chance of passing without a dedicated review.

In 1971, in Practice Ques-tions for the CDP Exam, I in-cluded several sections with

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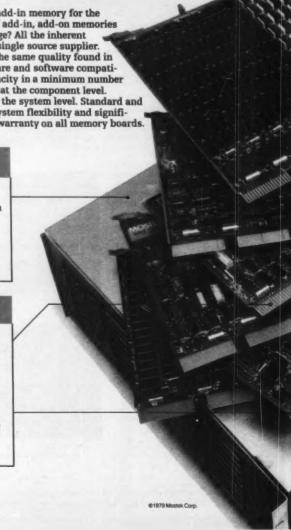
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LETTERS

helpful hints on studying for the exam, Hints on how to select the best answer and hints on getting a passing score. Over the years, many people have said they found these hints to be the deciding factor in passing the CDP exam.

For those who want to pass the CDP exam — whether or not they want to impress their associates with how few sittings it takes — I have updated the hints portion of my book to reflect the current examination structure.

The four-page publication is available for a self-addressed

*A tradement of Digital Equipment Corp

stamped business envelope and \$3. The address is 2596 DeFoors Ferry Road, Atlanta, Ga. 30318.

Getting together after the exam is a very good idea. It has been my experience that not many people will be willing to get together; but, it is a good idea. I think I pioneered it in 1968.

A word to the wise: Use it as an opportunity to find out

how you picked the wrong answers; or how you got scared away from some questions

you could have answered correctly; or how you picked the right answer to the wrong question

Don't try to use it as an opportunity to convince others that the exam should be easier. You have to pass it before you can do that!

James B. Steiner

Compiler Gives Cobol a Boost

(Continued from Page 25) piler their manufacturer is offering.

The most important market development, however, will probably be the unprecedented emergence of buying by specialist software houses, who themselves want to produce and develop software products for the market without having to tie themselves to the particular hardware/ software operating system combinations. For this group, the integrators, the use of portable standard Cobol makes a great deal of economic sense.

They can select the best application writers from the widest base of trained programmers available and then sell their products without being tied to particular hardware offerings which are constantly changing or being withdrawn.

The inability to effectively serve markets in the same application-skill area has been a terrific drawback for specialist-developers. Hopefully this will now vanish as technology opens wider op-

portunities.

End users will also continue to be a market, of course. Everyone wants a Cobol compiler to be available, and everyone has some use for it. The strength of the market will depend upon the developing competition, but the market should expand well beyond present levels.

The greatest news, however, is simply that the batch/interactive revolution has given Cobol new opportunities for growth, rather than killing it off as had appeared possible. Even the problems of conversion from Cobol 74 to future Cobol standards seem to be greatly minimized by having a selection of competi-

tive Cobol.

Cobol, which speacks in English to the technical many, and not just to the technical few, may rarely be the cutting edge of technical advancement, but it is far and away the most popular and understood language, and it is good to have its future safeguarded.

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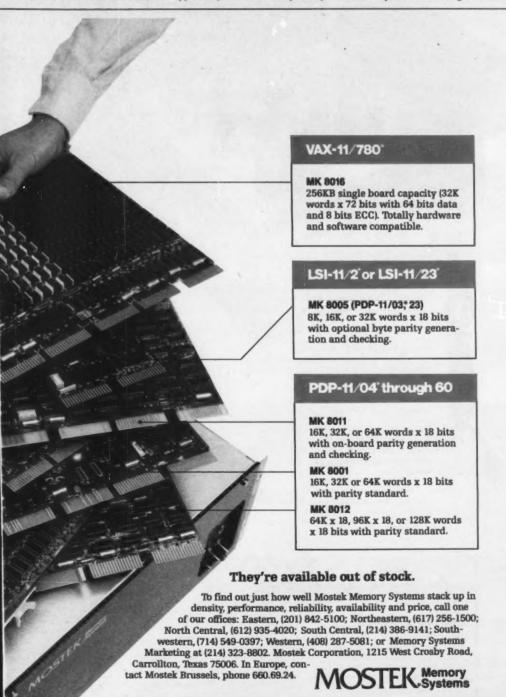


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Technological Trends Surfacing

Conferees Warned of Impasses to DBMS

By Marcy Rosenberg
CW Staff
NEW YORK — Before data base technology can advance, the industry must grapple with issues involving personnel, user resistance, privacy and software performance, according to Robert G. Adam, a manager in the consulting practice of Arthur Young &

Addressing an audience at the Second Association for Computing Machinery Greater New York Regional Conference, Adam spelled out potential problem areas looming in the 1980s:

· The diminishing supply of skilled data base administrators.

· A significant failure rate and limited utilization of installed data base manage-ment system (DBMS) facilities. This, he said, can be attributed in part to management which continues to view data base systems the way it has traditionally viewed data processing - as a "back room operation.

Data base technology is most successful when not looked at as DP, but rather as information resource management," Adam A lack of understanding of the long-term significance that a data base philoso-phy implies. Considerable data base design effort is needed up front to smooth implementation.

Adam also pointed out that users often fail

monitors - many of which can handle only one message at a time - with the multithreaded DBMS. Page 31

OFTWARE

· Data base design architectures, which may be limited to evolutionary and not revolutionary changes for two reasons: first, the

Frequently, people go into data base because they're in a lot of trouble, but the ultimate payoff really takes three to five years.

to realize the long-range payoffs of DBMS: "Frequently, people go into data base be-cause they're in a lot of trouble, but the ulti-

The privacy breach potential in data base, especially as natural, English-like language facilities emerge. In the past, job control language would frustrate persons trying to access a system, Adam said, but as language. guages approach English-like form, "security measures taken at compile time or at job initiation time are no longer good enough.

· Performance degradation in large, online data base environments. There have been problems interfacing teleprocessing design architectures are tied to hardware technology developments and, second, users' significant investments in existing DBMS technologies will inhibit revolutionary changes.

Evolving Trends

Adam cited several technological trends that are starting to evolve. Distributed data bases, for one, could play a major role in the future of DP, he predicted.

Adam sees three types of distributed DBMS likely to surface: hierarchical, where a single copy of the data base resides at a (Continued on Page 32)

DP Project Estimating — Part 3

Accuracy Makes Non-DPers Believers

By John Sanders

Special to CW
A significant credibility gap still exists between many DP departments and non-DP segments of an organization. Although there may be a number of reasons for such gaps, unsatisfactory estimating is usually among the "culprits.

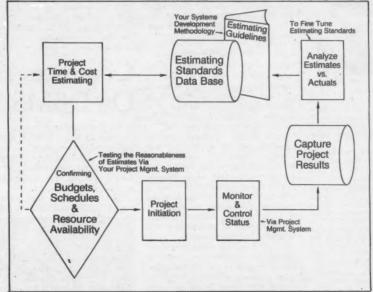
It has been implied that DP people do not

This last installment of a three-part article on DP project estimating discusses how an effective estimating process can alleviate functional DP and project management problems

know how to do their jobs unless they can give accurate estimates with little or no meaningful definition of project scope. Subsequently, because of their convenience and visibility, variances would be the primary measure of how well DP had done its work

Sometimes, these expectations and superficial evaluations even occurred within the DP department. Little wonder then that project teams were tempted to "pad" their esti-mates. But once a reputation for padding es-

(Continued on Page 32)



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Accurate Estimating Can Fill Credibility Gaps

(Continued from Page 31) timates is acquired, a vicious circle arises of arbitrary cuts and clever concealment of the amount of padding.

By inaugurating a systematic estimating process which incorporates the 11 vital components discussed in Part 10 the series [CW, April 7], it becomes possible to "wipe the slate clean."

Open treatment of uncertainty, consistently realistic and supportable results, constructive review and meaningul analysis of results can overcome the bad tast left by unsystematic estimating. These benefits then tend to spill over to other aspects of DP's image and help put the role of DP systems into proper perspective.

Without realistic estimates to work

Without realistic estimates to work from, project schedules and resource

allocations will correspondingly lack realism. Yet there is a danger that a dazzling assortment of scheduling reports and bar charts will give an undeserved impression that all issues have been resolved.

As an alternative, the estimating process supports an automated scheduling and control system in the following

 By providing realistic estimates at the appropriate level of detail as the basis for effective scheduling.

 By helping to anticipate scheduling needs, task dependencies and resource assignments.

 By setting the stage for communicating the schedules and keeping them in perspective with prevailing project uncertainty.

In turn, a project scheduling and control system can support the estimating process by:

 Helping to apply tests of reasonableness to the estimated cost rates and resources, possibly for alternative project manning patterns.

 Monitoring project status on a regular basis, and tracking actual effort and expenditures for analysis.

 Being responsive to actual or proposed changes in project scope and constraints.

Without this synergistic interaction between the estimating process and the scheduling/control system, project managers are seriously handicapped may not achieve the level of effective project management which complex DP projects deserve.

Varying Standards

Projects are rarely, if ever, undertaken with the intention of producing substandard results. True, standards do vary, so results should match the project objectives. But the best of intentions can go astray under the influence of unrealistic estimates.

When faulty estimates are established without benefit of self-correcting measures or when changes in the project scope, cost and schedule are not synchronized, severe pressures can be placed on the project team to take shortcuts. Often these pressures manifest themselves in superficial study and analysis, sketchy documentation and reduced attention to system reliability and maintainability.

Even if the system manages to work and project variances appear acceptable under these conditions, the underlying problems will haunt DP in the future. Of course, there are times when the project turns into a fiasco because major reworking is needed before the system operates properly.

An effective estimating process avoids these pitfalls not only by producing better estimates, but also because it forms the baseline for controlling change and centers around deliverables which act as checkpoints for quality assurance measures throughout the project.

In addition, effective estimates provide a means for objectively evaluating the cost/benefit ratio of optional system features, thus avoiding the overkill which can occur when projects are overestimated.

Simply put, a better estimating process helps DP consistently achieve better systems with better return on investment.

Good estimating also helps protect or

improve DP productivity in a number of important ways:

 By avoiding the crisis atmosphere which underestimated or overly optimistic schedules create. Despite the customary flurry of visible activities, personnel seldom operate at maximum efficiency in a crisis mode. Sustained overtime not only drains and frustrates most personnel, but may involve premium cost rates.

Attempts to salvage the schedule by hasty peak manning often intensifies the problem. Sometimes, it is necessary to go to great lengths to alleviate, or just to explain, the crisis, whereas this energy would otherwise have been available to make meaningful progress.

The list goes on, but besides system quality problems, it may include distortions of the true project cost, thus justifying and possibly perpetuating faulty estimating practices and continuing productivity losses.

 By avoiding unrealistically high estimates which can create the opposite of a crisis atmosphere.

Such lax project climates may "demotivate" personnel and cause work to expand to fill the available time. There also may be little or no incentive to seek or use improved development tools.

Further, accusations of padding the estimate may make it more difficult and time-consuming to obtain approval of future estimates, no matter how realistic. And if personnel are rewarded for favorable variances, a couterproductive precedent may be

set.

 By protecting resources earmarked to improve productivity. Fast changing DP technology continually produces new tools that can help personnel become more productive in many ways. However, resources must be allocated to evalute, introduce and then support such improvements.

Yet poor estimation on other projects or endeavors often leads to reassignments to deal with the crisis of the moment, or to underutilized personnel when lax projects stretch out.

As a result, opportunities may be lost or promising new tools will die on the vine for lack of supporting resources. And even when more productive techniques are successfully employed, the benefits may be partially or entirely obscured by the variances ineffective estimating creates.

As the second article in this series [CW, April 14] pointed out, the DP department is not the only beneficiary of a better estimating process. Its benefits enable DP to provide better service and more responsive support which ultimately are in the interests of the entire organization.

Just as renewed credibility can spill over to nonestimating domains, the improved communication and constructive, egoless interactions concerning estimates can foster a high level of cooperation both within the DP community and between DP and its clientele.

Sanders is a senior project management consultant with Atlantic Software, Inc. in Philadelphia.

Conferees Hear Warnings On DBMS Impasses

(Continued from Page 31)
central node which fields all requests;
partitioned, where a single copy of the
data base is divided among the nodes;
and replicated, where duplicted portions or all copies of the data base exist
at all nodes in a network.

While the first two approaches can minimize concurrent update problems, the monitoring required to avoid such conflicts would increase system overhead and could reduce throughput, Adam explained.

How rapidly distributed data bases emerge, however, hinges on refinements in communications network technology, the extent of investments in current data base architectures, cost and organizational impacts.

Adam raised several questions to illustrate how distributing data bases may impact user organizations: "If we distribute data bases, do we also distribute the data base administrator who is already in short supply?"

Data Dictionaries

Further, distributed data base technology depends on modification of data dictionary facilities, which traditionally were designed to support a centralized data base organization.

The immediate future trend in data dictionaries, as Adam sees it, is toward continued refinement and integration into the DBMS. This must happen, he maintained, if data is to be viewed as a corporate resource that must be managed, controlled and organized.

What is called for, then, is a data dictionary that will identify, record and monitor the impact of changes to application systems and interface with more than one vendor's DBMS to protect a firm's investment if it switches to another system, Adam said.

The data dictionary of the future will also provide the comprehensive, concurrent documentation so essential in an on-line environment and enforce standards and policies for data base use.

On the Horizon

Also peeking over on the DBMS horizon is a rapid acceptance of natural language facilities to provide query capabilities using English-type statements.

These could eventually eliminate the need for programming assistance and will underscore the need for more sophisticated data base security and privacy features, he emphasized.

The DBMS evolution will also include:

 Development of more formalized and practical data base design methods, such as the top-down structured approach.

 Dynamic data base network interchanges.

 Introduction of generalized applications packages tailored to include DBMS capabilities. This will parallel the user migration away from in-house program development.



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System for Eclipse Manages Transaction Processing

WESTBORO, Mass. - Data General Corp. has released the Transaction Processing Management System (TPMS) for its Eclipse line of process-

TPMS was designed to give Eclipse users high-volume commercial trans action capabilities under DG's Advanced Operating System (AOS). It monitors multiterminal operation and provides interactive screen format generation, user-defined logical trans-actions, flexible system and data security, file backup and recovery as well as improved transaction throughput, the vendor claimed.

The package is said to integrate the AOS resources required to develop and run transaction-oriented applications including Cobol and PL/I. It contains a Cobol debugging feature, format testing capabilities, an Infos II file management system interface, program restart and recovery procedures and support for large terminal configurations.

Two Components

TPMS consists of two major components. The Transaction Control Program is used for transaction applica-

tion development and overall control of the TPMS environment. The Console Control Program activates terminal screen formats, validates data entry and maintains a log of transaction activities, the vendor said.

A TPMS library utility maintains an active catalog of system applications and formats. This feature reduces process redundancy and increases the overall performance of the system, DG

The system is aimed mainly at industrial and DP shops that process a high volume of repetitive transactions.

Banking institutions can use TPMS for account inquiries and updating.

Manufacturing and wholesale/retail firms can use the package for inventory management, workshop scheduling, bill-of-materials handling and order entry, the vendor said.

TPMS costs \$5,500 including the initial license, installation, a one-year software subscription service, oneyear comprehensive support service and one training credit. The subsequent software fee for the package is \$3,000, DG said from Rte. 9, Westboro, Mass. 01581

Assembly Language, Too

HP System 45 Gets DBMS

PALO ALTO, Calif. — Hewlett-Packard Co. is offering a data base management system (DBMS) and an assembly language package for its Se-ries 9800 System 45 desktop computer

The DBMS, designed for scientific and technical users, consists of two principal components: Image/45, a data base manager, and Query/45, a

user-oriented inquiry program. Image/45 is an adaptation of HP's Image DBMS, which was designed for the HP 3000 processor. The package contains enhanced Basic statements and system routines to handle data base structures.

Image/45 can handle up to 32 data sets. Each data set can have two levels of data files, HP said.

Each data set can also contain up to 32,767 data entries depending on the length of each entry. Each single entry is limited to 1,022 bytes. The maximum capacity for the data base is 268M bytes, the vendor said.

Image/45 uses embedded pointers to logically connect records with common attributes into chained lists. This establishes cross-referenced access to data sets down to the data item level, HP said.

Up to 16 index files can reference a detail data set and up to 16 details can be referenced to one master. Data access methods include serial and direct access as well as calculated and chained access based on a key-item value.

For security, files are accessed via passwords that can be assigned to individual users to authorize different modes of access, the vendor noted.

Inquiry Program

Query/45 is said to allow untrained personnel to use the DBMS. Made up of nearly 500K bytes of Basic-1 language code, Query/45 offers data base definition and creation; data base searches; data base updates; and listings including graphical data represen-

The inquiry program allows data bases to be maintained with or without prompting. By establishing ranges of acceptable input values and specifying what items must be included in data inputs, the system reduces the user's probability of entering incorrect data. This can reduce the need for customized user programs in many applications, HP claimed.

The DBMS can be added to the System/45 desktop system via two plug-in read-only memories (ROM) and a 500K-byte software package. At least two flexible disk drives or one hard disk drive should be included with each system. Up to four drives can be used for multivolume data bases, HP said.

Assembly Language

The assembly language package announced with the DBMS was designed to enhance the System 45 by boosting its speed in time-critical portions of Basic programs. The package can be used as a second language on the Sys-

The package is said to offer experienced programmers control of system's CPU through machine instructions, pseudo-instructions and Basic extensions. Assembly language

also allows instructions to be written as specialized routines callable from a Basic program, HP said.

Assembly language can be added to System 45 via optional ROMs. An execution and development ROM provides the ability to write, edit, debug and run assembly language routines; an execution ROM provides run-only capability for previously developed machines.

The System 45 DBMS costs \$5,000. The assembly language execution and development ROM costs \$2,500 and the execution ROM costs \$500.

Documentation and training courses are available for assembly language, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

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Multifaceted Job Described

Management Help Called Essential to DBA

By Marcy Rosenberg

CW Staff

NEW YORK -The marathon of the data base administrator [DBA] is not going to be a footrace for the short-winded.

And if management is not committed to helping you implement your role, it's going to be tough."

The runner in this case was Al G. Brunettie, who has been chalking up miles as a DBA for nearly six years at New York Telephone Co. He talked about the function of this relatively new DP professional at the Second Association for Computing Machinery Greater New York Regional Conference here recently.

While drawing upon his own experiences to paint a picture of the DBA function, Brunettie borrowed from the words of Rudyard Kipling to describe this job's charter: to "keep your head when all others about you are losing theirs and blaming it on you.'

Stressing that the responsibilities vary with the size of the organization and kind of systems to be implemented, he said the DBA may be one person or many who must interface with management, applications, users, operations and systems groups.

Pandora's Box?

In a nutshell, the DBA at New York Telephone centralizes the control and management of corporate data resources, maintains the integrity of the entire data base environment and aids in planning, implementing and maintaining new systems, Brunettie said.

Cracking open that nutshell seemed to the audience of aspiring DBA some-

'We've done so much with so little - now we can do everything with nothing.'

thing like taking the lid off Pandora's box when the speaker expounded on

· Monitoring data base use and corporate growth.

· Designing, implementing and documenting control and use of corporate data bases

 Satisfying the requirements for data base service. At New York Telephone, first priority is "getting the bills out," Brunettie explained. Functions of other departments took second place and, when many of these departments acquired their own dedicated computer systems, data duplication re-

 Maintaining data base continuity and security, data integrity, backup and recovery. Brunettie cited one question that often comes up: What do you do about backup and recovery that involves a large number of communications lines? How do you duplicate

"We don't know the answer," he admitted, "and that's pretty bad because we're a telephone company.

· Controlling responsibility for information in data bases.

 Improving data base performance. Providing data base standards and operations guidelines.

· Providing file reorganization procedures and schedules when necessary. New York Telephone uses IBM's Information Management System, Brunettie said, "and we've found that reorganization is one of the few tests of whether you have a reliable data

Controlling the content, use and maintenance of the corporate data dic-

 Planning, installing and controlling all data communications facilities.

· Developing and maintaining data control standards.

· Developing and controlling checkpoint and restart requirements.

· Determining priorities in process-

· Improving network performance through fine tuning.

· Establishing procedures for terminal users.

• Determining, controlling and generating screen and transaction for-

How easy it is to perform this last function depends largely on how well users communicate their needs, Brunettie remarked. But, as he pointed out, "finding out what a user wants can be worse than going to the dentist

you have to pull teeth."

On the other hand, users can so narrowly define needs as to stir a debate over where the cursor should orginate on a screen, he added.

Problem of Control

If being a DBA at New York Telephone sounds like a tall order, it may be because the organization has 6.5 million customers and handles up to 900 pages of tolls on one bill.

Brunettie is one of close to 40 DBAs there who reign over nearly 70 data bases, he noted, adding that the firm uses 250 IBM 3350 disk drives dedi-

"We've had problems with control," he said, "because we've developed central programs that are used throughout the state." Ensuring data's status as a true corporate resource in this environment demands good control and documentation that is selfexplanatory, he continued.

As a step in that direction, New York Telephone recently consolidated six DP departments into one organization whose charter is to be able "to study any data base management system proposed for purchase to see whether it will make bucks and save bucks for the company," Brunettie explained.

Another reason for the consolidation was that every department had its own DBA, each of whom became captive and "caused us to lose data integrity."

Living With Ma Bell

But like many other companies, New York Telephone remains a small part of a large organization. As such, it often has no control over what hardware or software it will use and no say in systems design, Brunettie said.

He was quick to add, however, that being "one of the many little children of Mother Bell" does have its advantages. When it comes time to acquire a new system, his firm can look at systems already operating at other Bell subsidiaries — "a luxury that gives us user inputs, lets us short-circuit the developmental process and cut costs, for example by bypassing testing in some cases," he explained.

Although the DBA function at New York Telephone may not be typical, Brunettie felt justified in saying that wearing this hat "is not an easy job because it often involves giving answers that your boss won't like or the user department won't like or management won't like."

And in an organization like New York Telephone, mistakes are not \$10,000 blunders, but more like \$1 million mistakes, he observed.

Boiling down to one sentence his impression of how a DBA earns his keep, Brunettie concluded, "We've done so much with so little - now we can do everything with nothing."

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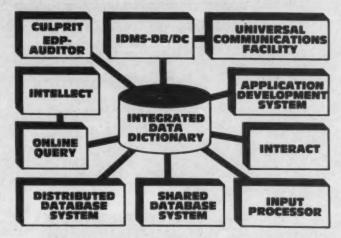
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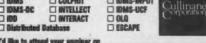
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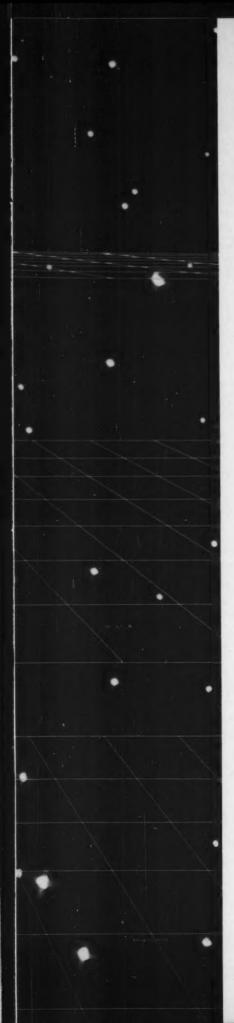
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· Produce detail and summary reports to support charging.

· Generate a billing file compatible with the vendor's data acquisition system, Komand/DAS, and resource billing system, Komand/ RBS.

Komand/CCI can compute transaction charges taking into account up to 24 resources or apply fixed charges by transaction type, the vendor said. Special transactions and transaction/-terminal/operator keys can be speci-

The output of Komand/CCI allows the user to format charges for CICS/-VS usage to be compatible with other computer usage charges such as batch and TSO, the vendor claimed.

Subroutines, Utilities Back

ware products designed to enhance the Equipment Corp. PDP-11 CPUs running DEC's RT-11, RSX-11M, RSX-

of subroutines callable from Fortran, Basic+2 or Cobol to give the applica-tions programmer independence from a specific CRT terminal model. It also offers protected fields and cursor control, the vendor said.

vides subroutines and utilities for screen management. Multiple screen formats can also be used simultane-

program for communication with the Vidio terminal operator.

program to integrate its error message and response requirements with those

Vidio/11 is supplied as an object library on magnetic tape with installation instructions and a user's manual. includes SCRNIO/11 (which Vidio/11) is suplied as an object library and a set of stand-alone utility programs, also on magnetic tape.

terminal and one operating system. SCRNIO costs \$3,500, PSI said from 65 S. Main St., Pennington, N.J.

HP 3000s Gain **Utility Billing**

SEATTLE - A billing and customer information system for cities or utility districts providing any combination of electricity, water, sewer and solid waste services is available from Western Data Corp.

Written for Hewlett-Packard Co.'s HP 3000 processors, Utility Billing/3000 includes an on-line program through which terminal operators can perform data base maintenance and ac-

Inquiry capability is available via acand consumption history data.

bol, the on-line program in SPL.

The software costs \$12,500 from the vendor in Suite 401, 444 N.E. Ravenna Blvd., Seattle, Wash. 98115.

CRT Terminals on PDP-11s

of CRT terminals on Digital

11D and IAS operating systems is

Komand/CCI licenses for \$2,500 from Pace Applied Technology at 7900 Sudley Road, Manassas, Va. 22110. fied generically to reduce implementa-

Databus Compiler Released

NEW YORK - A compiler for Datapoint Corp.'s Databus business language is available from Dispersed Software Systems, Inc. (DSS).

Compatible with Datapoint's Datashare operating system, the compiler reportedly makes Datapoint CRT terminals intelligent. This allows users to continue production while compiling programs - an option DSS said was previously unavailable.

The compiler does not require additional hardware. However the number of concurrent compilations is limited to the number of CRT terminals attached to the system, the vendor said.

The DSS compiler runs with Datashare 5 Version 2 and later. It requires a minimum of 2.25K bytes.

The one-time license fee of \$3,000 includes the compiler and six utilities (CAT, FREE, COPY, KILL, BUILD and LIST), the vendor said from Suite 1013, 80 Wall St., New York, N.Y. available from Pennington Systems,

Video I/O/11 (Vidio/11) is a library

Screen I/O/11 (SCRNIO/11) proously, PSI said.

SCRNIO/11 reserves the last line of a terminal screen for error messages and interaction with the terminal operator. Any area of the terminal screen not included in the current screen for-mats is available to the application

SCRNIO also allows the application of SCRNIO, the vendor said.

Vidio/11 costs \$1,500 for one CRT

count inquiry functions.

count number, service address and tenant name. Account status, detail transaction history and past billing information is supplemented by meter

Utility Billing/3000 uses HP's Image data base management system. Batch reporting programs are written in Co-

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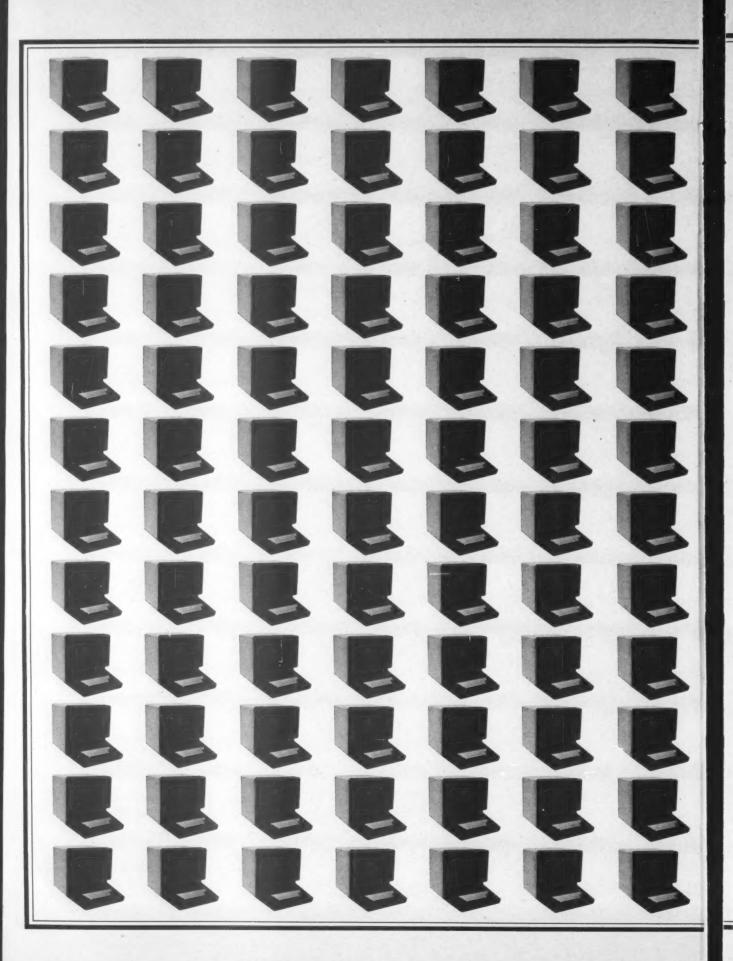
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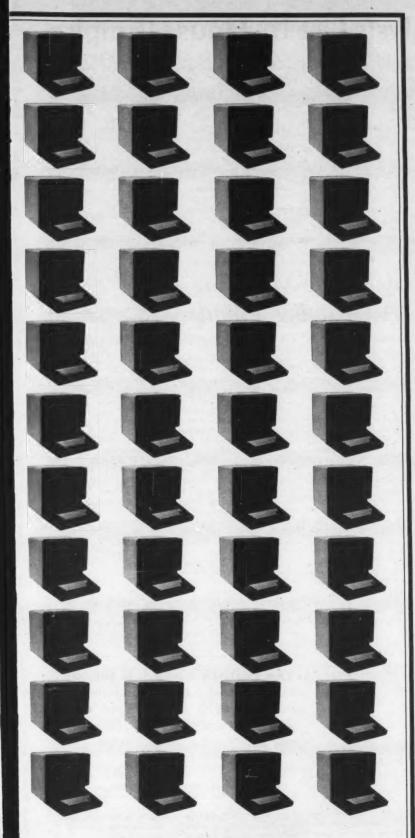
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Delivery Firm's Analysts Get In-House 'Empire'

By Bruce Hoard

CW Staff MEMPHIS, Tenn. - When Federal Express Corp., an air and van package delivery firm, decided it wanted to bring its financial modeling system in-house in 1977, it said "Hello Empire."

Empire, a financial modeling system offered by Applied Data Research, Inc. (ADR) is Federal's replacement for the Service Bureau Corp. and Prophet II, the financial modeling system that firm used.

Federal made the change because data in its system was not immediately available, and financial analysts had to work constantly with programmers not familiar with the complex financial terms necessary for creating programs.

Empire's Competition

Michael Sternad, director of management information and control systems for Federal. evaluated three systems before deciding on Empire: Prophet II by Zia Computer Corp., Multiple Access Group's Fi-pac and Cuffs by Cuffs Plan-ning and Models, Ltd.

Prophet II was not very flexible. It didn't lend itself to more complex modeling." It was also unsatisfactory because it used an interpretive language, he said.

Sternad passed on Fipac be-cause it used codes instead of an English-like language. For example, Fipac referred to various rows as X1, X2, and X3, whereas Empire referred to them by English-like names such as cost, sales and profit. Fipac was Federal's second choice, however, because its functions are very similar to Empire's, he said.

Federal rejected Cuffs because it restructured statements, a trait its vendor considered to be a strong selling

"I put in a certain set of code, and it would try to figure out which way the statement should come in logical processing order," Sternad

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Since Federal was the first real user of Empire, there were some problems. The package, initally installed on a Burroughs Corp., B6700, was hampered by I/O problems.

Federal determined that those problems were caused by the Burroughs I/O processor, which slowed the system's ability to deliver a read file to the CPU. After about a month, Federal solved that problem, Sternad said.

In January 1979, Federal switched from the B6700 to an IBM 3033, and again the I/O problems cropped up. This time the problem revolved around making the Time Sharing Option (TSO) do a dynamic file allocation, a requirement for Empire. In order to get around that prob-lem, the dynamic file allocation was switched from Fortran to assembly, according to the spokesman from Federal. Several features of Empire

made it superior to its competitors. Report writing, data management, graphics, statistical analysis and simulation were among those features.

The report writing capability is in a seperate module from the model itself. It can produce between one report and 20 reports from a single

"With Empire, a person who makes a variety of format changes can lay out the data items in 10 minutes as op-posed to rewriting the report," Sternad said.

The system's data management capabilities are a "distin-guishing feature" that allows data to be brought in from ex-ternal files or entered interactively with Empire. It also provides a set of manipulations that can shift data, move it around or do transformations.

Version 3

Although recent versions of Empire used what Sternad re-ferred to as "straightforward character graphics," Version 3, scheduled to be released at the end of April, will use Tektronix, Inc. terminals. With a more sophisticated capability, Version 3 will be able to produce line and bar

In using Empire for statistical analysis, Federal, instead of showing a variance from the budget, is now showing a variance from a projected progression line. Preliminary statistical analysis is very easy to access with the system, according to Sternad.

In the area of simulation, Empire can develop a model for answers and then look at the worst and best cases, the distribution of probable variables and the end results, the company spokesman said, and credited the system's executive, or built-in logic, library for that capability.

Sternad said he can query Empire about the possible effects of variables within a model and the significance of the effects, given a 1% change in any of them.

Version 3 of Empire contains several new enhancements, such as the improved graphics package, a strengthened statistical function and a more efficient interface with TSO.

In-House Modeling A Growing Trend

STAMFORD, Conn. More and more financial modeling systems have been offered for in-house installation during the past three years, according to a recent analysis by Real Decisions Corp. (RDC).

The analysis revealed that the percentage of packages available for license or sale has nearly doubled from 44% of 16 programs in 1977 to 85% of 26 in 1980.

The analysis appeared in the 1980 edition of RDC's "Financial Modeling Decisions. The report noted that all 13 packages submitted as new entries since 1977 are available for in-house installation.

The effects of inflation were also included in the study. There has been a 20% increase in the cost of six packages, with price hikes ranging from \$1,000 to \$13,000. Those systems are now priced from \$20,000 to \$48,000, the study said.

The cost of performing fi-nancial jobs through timesharing vendors can vary greatly, the study reported. In six financial modeling problems solved on 22 timesharing vendors' systems, the overall average cost-spread factor was more than 10 to

Benchmark Runs

In analyzing the reports of 21 separate benchmark runs, RDC determined that the minimum differential in CPU costs for a single run computed to be a factor of six times the lowest cost. In the most extreme cases, the costs of some runs on the 22 vensystems ranged greatly that the factorial differences reached highs of more than 30 to one.

In addition to cost differences among competitive systems on the financial benchmarks, large differences were

also noted within individual vendors' systems. For example, four vendors

that showed highest costs for one of the 21 runs also showed lowest costs for another run.

The study concluded that costs are closely tied to the capability being exercised by a particular problem. It said that systems differ widely in their efficiency and cost of implementing financial problems.

A methodology for the development of such criteria given in the introduction to "Financial Modeling Decisions," RDC said. The 700-page study costs \$995 and includes updates and additions, to be received through 1980.

Interested users can select minireports" on either four or eight systems selected from the complete version. The four-system minireport costs \$325 and the eight-system minireport costs \$625, RDC said from 123 High Ridge Road, Stamford, Conn. 06905.

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As Remote Entry and Text Medium

Report Sees Teletex Edging Out Telex

By Brad Schultz CW Staff

LUTON, England - DP users looking for a digital means of text communication should look beyond telex to teletex - a faster, less congested and more reliable service destined to be the world's standard text communication medium, according to a hightechnology consulting firm here.

Teletex may become a popular means of data entry and retrieval in DP shops around the world, although the service is primarily intended for electronic mail applications, Mackintosh International concluded in a report, "The Future of Text Communications: The Impact of Teletex."
What about facsimile? That

medium outshines teletex in convenience, but is more expensive, the firm noted. Allowing easy input of messages, facsimile will be more popular in offices lacking terminals, but DP users will probably prefer teletex, which should prove less costly in most integrated data/word/voice environments.

The Consultative Committee on International Telephone and Telegraph (CCITT) coined the term teletex" a few years ago to describe a service linking typewriters in a network. But lately the concept embraces word processors and the trend towards integration of word processing and data communications.

Teletex Standard

By settling on a scheme for compatible teletex facilities, protocols and terminal features, the CCITT may adopt a teletex standard in 1980, Mackintosh said. West Germany and Sweden will probably launch national teletex services this year, followed in the next few years by offerings within North American and other European nations and, at

Data communications managers may find themselves super-vising teletex operations and the data communications industry will need to endow product lines with capabilities for supporting the service, which may eliminate demand for telex altogether, Mackintosh claimed.

Although Post, Telephone and Telegraph (PTT) and private carrier companies will set intrana-

tional teletex transmission rates at their own discretion, an international standard of 2,400 bit/sec (300 char./sec) will probably be adopted, the English consulting firm stated.

The minimum configuration for a teletex terminal is a controller, keyboard, printer, memory and line interface. With the exception of the mandatory receive memory, a minimum configura-

tion is not much more complicated than a simple word pro-cessor, the report observed.

Computer systems could run as a single teletex terminal or as a set of terminals - an arrangement that the European PTTs could, but probably will not, ban for fear that powerful systems (Continued on Page 50)

User Poll Pans Modem Diagnostics

By a CW Staff Writer

DELRAN, N.J. - Modem users complained about inadequate diagnostics in a just-released Da-tapro Research Corp. survey of 786 individual users at 272 sites running 26,702 of the analog-to-digital, digital-to-analog transmission converters. But the respondents gave their sets high marks in overall performance and hardware reliability.

In "All About Modems," a 52-page report that includes 37 pages of features and performance summaries for more than 400 modem models, Datapro suggests that users will be happier with the diagnostics offered by the newer, microprocessorcontrolled units.

Under a rating scheme where "excellent" = 4 points, "good" = 3 points, "fair" = 2 points and TOP PERFORMERS

Bell 113A Gandalf Data, Inc. LDS 309

Racal-Milgo, Inc. Comlink III Spectron Corp. ME 81

NOT SO HOT

Burroughs Corp. all models

Bell 201A (2.8)

General Datacomm Industries, Inc. 103 (2.7)

Syntech Corp. 208 (2.3)

According to Datapro, each of the modems on the left was rated excellent in overall performance by every user surveyed. Racal-Vadic, Inc. and Gandalf also won unanimous verdicts of excellent in miscellaneous slots (see chart on Page 46).

poor" = 1 point, users gave their modems a lackluster 2.7 average in diagnostics, but also registered respectable 3.5 averages for their sets' hardware reliability and overall performance. Modem maintenance pulled a 3.0 average (see chart on Page 46).

The survey found some modems rated very high in two or three categories, but dismally low (Continued on Page 46)

With Cost/Performance Benefits

SPCC Plans Domestic Satellites

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. - A communications satellite promising data communications users a number of cost and performance benefits is being planned by Southern Pacific Communications Co. (SPCC).

Late last month, the company requested authority from the Federal Communications Commission (FCC) to construct three satellites, each providing 2,880M bit/sec of digital transmission capacity. This is substantially more than "any other domestic satellite presently in orbit or under construction" offers, the company said.

By operating the system at both 4/6 and 12/14 GHz through

common satellite and groundstation facilities, SPCC expects to reduce costs substantially for users located in major cities.

At present, satellite communications networks that employ 4/ 6 GHz must usually rely on earth stations built far from the user's site. A long and expensive terrestrial connection is usually re-

(Continued on Page 46)

SINIMAN AR(O)

Page 43



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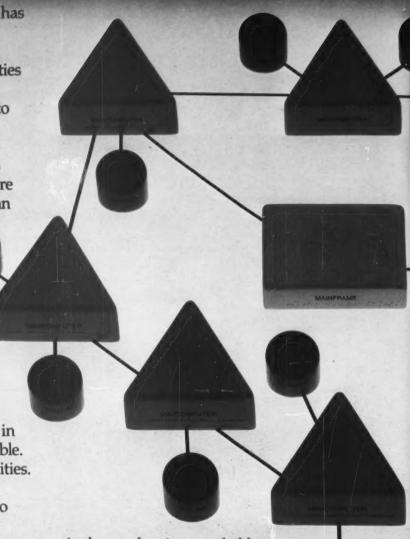
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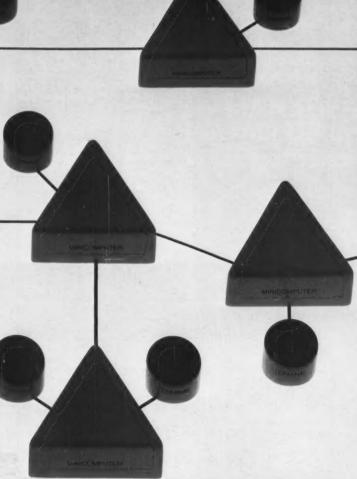
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Diagnostics Found Top Gripe of Modem Users

(Continued from Page 43) on another point or two. IBM's 3603 set, for example, won perfect 4.0 ratings from three users of 72 units for performance and reliability, but also

got a 1.7 and a 2.0 in diagnostics and

maintenance, respectively.
Bells' 202C garnered 3.7 averages in performance and reliability and a 3.3 average in maintenance, but the modem was unanimously considered poor in diagnostics.

Maintenance Ratings

From the standpoint of maintenance, some vendors are clearly more popular than others. In that category, Comdata Corp. scored a 4.0 average for all its models, as did General Datacomm Industries, Inc. for its LDM-1; and Racal-Vadic, Inc. won a 4.0 average for its 1200 series.

In contrast, Intertel, Inc. and Ven-Tel did far worse in maintenance than in other categories by turning up 1.8 and 1.5 averages, respectively, for all their

modem models.

As a conspicuous plurality — 40% of the sample population — Bell users rated their modems close to the averages reckoned for the entire sample in each category: 3.5 in both performance and reliability, 3.1 in maintenance and 2.6 in diagnostics. Excluding the last category, Bell's 202s, 209As and 212As drew solidly favorable averages.

Datapro launched its survey last November by sending its report subscribers a questionnaire on modems. By mid-December, the company had responses from 272 installations. Since organizations employed a number of different models, the total turnout numbered 786 users.

Of these, about 57% said they had local diagnostics capabilities and about 21% said they had remote diagnostics. Auto answer, automatic equalization, multipoint and multispeed features were identified by 32%, 31%, 25% and 20% of the respondents, respectively.

Datapro is located at 1805 Underwood Blvd., Delran, N.J. 08075.

SPCC Plans Three Satellites

(Continued from Page 43)
quired to link the user with the earth
station.

The 12/14 GHz band, by comparison, is congestion-free — no commercial carrier is presently using it, although several plan to do so. Furthermore, the use of these frequencies permits the installation of small-diameter "rooftop" antennae at the user's site.

The major drawback of the 12/14 GHz frequency band is that rainfall can sharply degrade signal quality. However, SPCC proposed several ways of getting around this problem, one of which involves providing alternate service through remote earth stations capable of operating at either 4/6 or 12/14 GHz.

Launch Dates

SPCC plans to launch its first satellite in 1982, the second one the following year and the third in 1984. Each will employ time-division multiple access (TDMA) multiplexing and transmit in analog and digital mode.

There will be 24 transponders on each satellite, and each transponder will have a usable bandwidth of 72 MHz instead of the 36 MHz provided by present commercial satellites. C-band (4/6 GHz) transmit and receive antennae on the satellite will provide coverage of the continental U.S., while Ku-band (12/14 GHz) antennae will provide coverage of high traffic density areas on each coast, SPCC explained.

Initially, three earth stations — at Cooksville, Md., Woodworth, Ill., and Running Springs, Calif. — will be connected to the existing SPCC terrestrial network. The total cost of the system is estimated at \$196 million.

FCC Filing

The energy crisis, combined with technological and regulatory changes within the communications industry, is likely to considerably increase the demand for telecommunications services and especially satellite services during the 1980s, SPCC told the FCC.

"The rapid rise in energy costs is making travel increasingly costly. At

the same time, technological advances through the merger of telecommunications and computerization and the emergence of a competitive market structure have exerted significant downward pressure on the real costs of telecommunications services." SPCC

"Furthermore, businesses are becoming more widely dispersed throughout the country. Accompanying these fundamental societal changes has been the development and evolution of new industries, such as pay television and electronic mail."

The demand for satellite transmission will grow even faster than the general increase in demand for telecommunications services, SPCC added, because of "the advantages of satellite transmission relative to . . . terrestrial transmission, particularly [for] long-haul traffic and point-to-multipoint video distribution."

Increased Demand

The SPCC application includes a detailed analysis of this increased demand, based on a study done by Future Systems, Inc. (FSI). Reflecting the increasing cost of business travel, FSI estimated the demand for two-way video teleconferencing circuits will grow from 293 in 1985 to 19,900 by 1990 and to 41,400 by 1995. Nine such circuits are currently in operation, according to the study.

Data traffic, encompassing electronic mail, facsimile, computer-to-computer communications, and "narrowband teleconferencing," will also grow rapidly, but FSI expects improved data transmission techniques to permit greater throughput.

As a result, the study predicts a much smaller growth in satellite circuit requirements. Between 1980 and 1990, the number of equivalent 36 MHz transponders required for data traffic is expected to increase from three to 74 and reach 120 by 1995.

The total demand for all forms of satellite transmission will grow from 135 transponders in 1980 to 443 in 1985, 4,794 in 1990 and 9,493 in 1995, the FSI study concluded.

Medicale Michael September 1	Data Communications Modems																			
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FGEND F - Excellent G - Good F - Fair P - Poor WA - Weighted Average based on a weighting of 4 for Excellent 3 for Good 2 for Fair and 1 for Poor

The above chart shows user evaluations of modems that Datapro classified under seven different headings: low-speed, medium-speed, high-speed, wideband (19.2K bit/sec and up), telephone couplers, parallel interface modems and limited distance data sets. In some cases, models that scored low in diagnostics simply lack such capabilities.

PBX Handles 4,000 Ports, 2,000 Cross-Connects

CHERRY HILL, N.J. — A private branch exchange (PBX) has been introduced that accommodates up to 4,000 ports and lines and handles up to 2,000 simultaneous cross-connects operating at speeds up to 9,600 bit/sec.

Infotron Systems Corp.'s Model TL 460 features user camp-on if a port is busy, console control, call transfers, redundancy and billing statistics. It is data-transparent and demands no changes to existing front ends or software, according to the vendor.

The TL 460 allows users to access any port on any computer in a network, comparing terminal speed and request for access with the classes of service authorized for the users. If no ports are available, the unit queues the callers, tells them why they were not connected and advises them of their place in line for the particular port group or CPU they requested.

Any input up to 19.2K bit/sec — dialup or dedicated, synchronous or asynchronous, port or line — can be connected to any other compatible input, Infotron said. Dedicated and dial-up connections can be transferred on request from the user keyboard, eliminating the need for dial-up users to hang up and redial, a spokesman noted.

Class assignments, speeds, connect and disconnect criteria and user keyboard selection routines can be changed at any time. All system parameters are under complete control of

Service Updates X.25 Simulator

TUSTIN, Calif. — Users of the Applied Data Communications, Inc. Pro/Tester X.25 network protocol simulator can take advantage of a service to update the simulator's software to reflect changes in the X.25 standard.

Performed every six months, the update service will enhance the applications to which the Pro/Tester can be put in order to check equipment compatibility, test and debug systems, perform on-line monitoring and validate X.25 protocol, the vendor said.

The Pro/Tester performs frame manual, frame automatic, packet-level and interactive interface tests. It can be used either locally or remotely via synchronous modems.

The Pro/Tester itself costs \$11,900, and the software update service is available with documentation for \$195. Applied Data Communications at 14272 Chambers Road, Tustin, Calif. 92680.

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the TL 460 console, he added.

The user can "busy out" any or all ports on selected computers on command, letting the TL 460 busy out all ports not in use and automatically busying out the rest as each call is com-

pleted.

Statistics for every user access, whether successful or unsuccessful, can be reported to allow identification of performance bottlenecks and to provide a basis for billing.

The TL 460 is available with dual load-sharing power supplies and standby central logic. Prices start at \$9,600, the vendor said from Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

ADC Switchmate Restores Data Circuits

MINNEAPOLIS — Network monitoring and control can reportedly be accomplished with a modular switching system from the ADC Data Communications Division of Magnetic Controls Co.

The ADC Switchmate was designed to provide restoral and control of network operation from a central point. The network can be monitored to locate faulty circuitry and equipment.

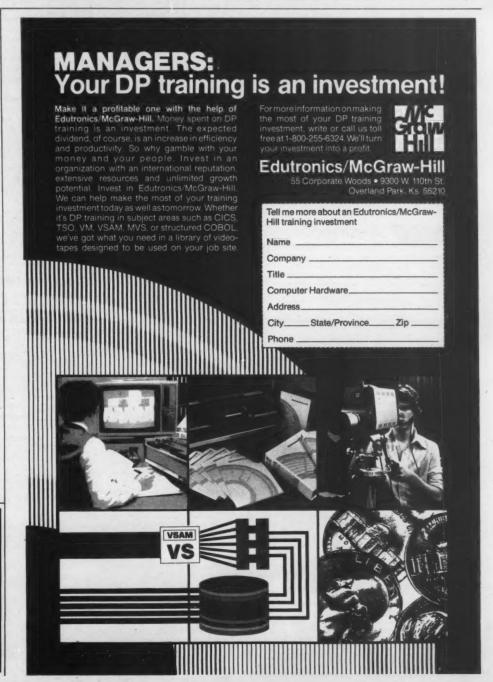
Remote switching and patching facilities allow the user to reroute a signal into different equipment or circuitry while troubleshooting and repairs are effected to restore the original signal path, according to the vendor.

ADC will tailor the Switchmate to specific network sizes and require-

ments. Its size can be altered to meet changes in requirements, the vendor said.

The system's price is dependent on the application, so a Switchmate could cost the user anywhere from \$5,000 to \$500,000, a spokesman said.

ADC Data Communications is located at 4900 W. 78 St., Minneapolis, Minn. 55437.



Lab Attributes 78% Growth to Printer Switch

By Bruce Hoard CW Staff

WICHITA, Kan. - An independent clinical laboratory here has reported large savings on operation and delivery costs after switching receiveonly printers.

Statlabs, Inc. analyzes a wide variety of lab tests for medical clients such as doctors and hospitals and then reports the results to them via printers on their premises.

Statlabs is now using Texas Instruments, Inc. Omni 800 Model 810 receive-only printers and has 40 of them spread out across the central

According to Vice-President Charles Lowry, fast reliable transmission of test results is a must for Statlabs. He said his company experienced a 78% growth rate last year and at-tributed much of it to the change of printers.

Before purchasing the 810s, Statlabs used Teletype Corp. Teletype 40 receive-only printers. Lowry was disap-pointed in them because he felt they were too expensive and had problems with the buffering.

They did not perform satisthe dollars factorily for

spent," he said.

Statlabs considered both Centronics Data Computer Corp. and Tally Corp. printers before acquiring the 150 char./sec 810. Lowry was not impressed with either.

"They just didn't offer us the full range of services and capabilities we wanted. We're located in a lot of small towns; and they just did not have the service centers or the reliability we felt we needed.

Basically, we were trying to find an inexpensive terminal that would reflect quality performance, give us good serviceability at an economical price and do the things we wanted it to do within our own system.

Versatility Important

Lowry said TI provided quick delivery; he also praised the 810 as being far more versatile than its competitors.

The 810's forms adjustment features were one factor Statlabs considered before buying. "We run many tests and, because of different medical specialities, doctors require a wide variety of report-

ing forms," Lowry said. The 810 can accommodate multiple-part forms and different widths and thicknesses of paper. The person receiving the report can adjust the thickness control while the printer is operating.

System Configuration

The 810s are linked to a computer configuration that includes three IBM minicomputers. System/7 Model A-16 is the senior of the three. It has 5 million char. of mass storage on disk and 16K bytes of main memory.

Until recently, the System/7 transmitted approximately 50,000 line items daily to the network of 40 Model 810s in the field with the aid of two automatic calling units.

Those responsibilities are now being transferred to a Series/1 Model 4955 with 13.9 million char. of mass storage on disk and 128K bytes of main memory. It will have 4

automatic calling units.

Lowry said that both the System/7 and Series 1 machines are, in effect, terminals for the System/3 Model 15D, which has 500M bytes of mass storage on disk and 384K bytes of main memory. He said it acts as a holding center for the data which the less powerful computers transmit.

According to the vice-president, the 810 has been a useful sales tool for salespeople because it allows them to demonstrate their service to potential clients.

A salesperson can take it into a doctor's office and hook it to a microprocessor. The printer will then generate a sample re-

After the printer has been in-stalled in an office, the client sends lab samples to Statlabs by courier or express mail. Statlabs then analyzes the samples and transmits the results back.

Many of Statlabs' clients prefer to locate the 810 at a courier's office. The test reports can then be transmitted in batch during the night for delivery to the client the next morning.

Lowry said his company plans to purchase additional printers and automatic calling units in the future.

Raster Terminal Has Vector Traits

SAN DIEGO - A color raster graphics terminal that is claimed to offer several times the speed and performance of exsisting raster terminals was announced here recently for computer-aided design and

manufacturing applications. The Whizzard 7250 from Megatek Corp. was designed to combine the color and highdensity features of a raster terminal with the 12-bit addressability and high-performance dynamic drawing capability of a vector refresh system, according to the vendor.

Complex pictures can be upand manipulated at standard 30Hz frame rates on a CRT monitor, Megatek said. The raster graphics system provides about 10 times the speed and performance of existing raster terminals, while it offers computer graphics users all of the dynamic linedrawing capabilities pre-viously found in vector reresh systems, claimed. Megatek

The Whizzard 7250 will support multiple color CRT configurations, with up to four full-color CRTs or 16 blackand-white monitors. The CRTs can be connected via a variety of interfaces to most 16-bit minicomputers and with 9,600 bit/sec serial asynchronous RS-232C systems.

The terminal's raster system hardware-, firmware and software-compatible Megatek's existing line of vector refresh graphics systems.

The microprocessor-based

7250 allows much of graphics processing overhead to be removed from the host computer. The user can specify up to 196K bytes of 32-bit words, each word holding up to two vectors or 4 char.

The 7250 costs less than \$25,000, but it can be purchased for black-and-white monitor systems for \$20,000, Megatek said from 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.

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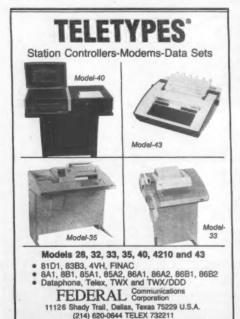
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Buy the new Perkin-Elmer 655 printer, for hard copy that's not hard to read.

The Perkin-Elmer 655 is the perfect match for your CRT. It gives you fast, quiet, low cost hard copy in large, highly readable type.

Most inexpensive printers print across the page, using a low resolution 5 x 7 matrix to cram 80 small, closely spaced characters into a six- or seven-inch line. The result can be hard to read:

48 PRINT "HIT AW KEY FOR NEW DEMO"

The 655 prints lengthwise down the page, placing 80 large, well spaced, high resolution 7 x 9 characters on a full 81/2" line. You get copy that's truly easy to read:

Perkin-Elmer Model 655

Yet, for all this the 655 is small -it measures only 6" x 12" x 12.5" and weighs just 15 pounds.

The 655 is fast. It prints an 80 character x 24 line page in just 22 seconds. And it's double buffered so it can print multiple page reports or listings continuously. At 1200 baud and above, the 655 tells your computer when it's busy by "XON" and "XOFF.

The 655 is quiet. It's a fixed head thermal printer with no moving wires, heads or print elements to bang on the paper. No impact noise.

The 655 is extremely reliable: the only moving parts are the platen and drive motor assembly.

The 655 is compatible with most CRT terminals with serial RS232C ASCII printer or auxiliary ports. It's the perfect mate for our own Bantam 550, especially in systems requiring the computer to control the CRT cursor.

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(312) 733-0497 Chicago, IL

Unit Replaces IBM 1980 Financial Terminal

CAMPBELL, Calif. - A re-placement for IBM's discontinued, but heavily used, 1980 financial terminal is available with an 88-char. or 96-char. daisy wheel printer and a standard 4K buffer from Data Terminals and Communications (DTC).
The DTC 382 includes

switchable dual ports that enable it to perform separate functions such as handling financial transactions through one port and receiving credit information from credit bureaus on the other.

A built-in modem on the first port operates at six switch-selectable speeds of 75 bit/sec to 1,200 bit/sec over four wires and can be connected to an external modem that operates at up to 4,800 bit/sec using an RS-232C interface. It also operates with a using a standard four-wire connection.

The second port includes an acoustic coupler operating at switch-selectable speeds from 110 bit/sec to 4,800 bit/sec using an RS-232C interface. Users can also choose full- or half-duplex transmissions and

even, odd or no parity, according to the vendor.

The DTC 382 printer runs at speeds up to 45 char./sec. The user can select 10-pitch, 12-pitch or proportional spacing printing on 132- or 156-column widths at 6- or 8

Loopback tests can be per-

formed on phone lines and modem.

Diagnostic tests can be performed at the terminal, and internal tests are made on the check printer, controller and memory operations.

Cost is \$5,500 from DTC at 580 Division St., Campbell,

World Impact of Teletex Predicted

(Continued from Page 43) jeopardize the privacy of their exported data flows.

Mackintosh also indicated that many shared processor facilities based on minicomputers could be modified to meet the prospective CCITT teletex standard, except in Sweden, which has especially tight restrictions against running transborder traffic through computer installations.

To accommodate the service. terminals will need "much larger" character sets than word processors typically provide. Mackintosh predicted that international, national national and private sets will be sanctioned in the expected CCITT standard.

Further, the standard will authorize users to implement network-independent procedures and protocols, but will specify maximum error rates and minimum levels of network availability, Mackintosh said. Users will be listed in directories distributed worldwide.

"For some carriers, there will be transmission and network control signal conversion problems at international gateway exchanges," Mackintosh continued. "There are good reasons for using the public switched telephone network in some countries [such as the UK] and a digital network in others [such as France].

"For message traffic, an endto-end connection is not necessary," the report said, "although the teletex standard may only state that the conversational mode is not required. The subscriber only needs a guarantee of correct delivery within some given time period. This will leave the PTTs free to implement the service on packet-, messagecircuit-switched works."

Users Overcharged?

At present, carriers compile line-use charges by counting pulsing periods that vary in length for the distance and time of day. The idea is to peg charges to the costs of supplying access to the transmission resources and to "encourage more uniform use of the network throughout the day, Mackintosh explained.

But message traffic usually

requires much shorter holding times than voice, the report pointed out, and those times are often much less than one pulse period. The existing arrangement would undermine the user's incentive to spread its transmission load.

Moreover, current methods of transmission billing rarely offer lower rates for lower priority service. And yet, message traffic usually is less urgent than data traffic, Mackintosh noted.

"To avoid overcharging, the

pulse periods and pulse charges could be reduced, if the meters are capable of counting fast enough for this increase in pulse rate to be implemented on international calls," the firm observed.

"To restore the inducement to use idle periods, it may be possible to start all calls with several pulses to represent the use of equipment for call setup and use the shorter pulse periods to effectively change the charging rate with time of day and distance."

Teletex Report Issued

LUTON, England - "The processing arenas. Future of Text Communica-tions: The Impact of Teletex" describes the teletex offerings expected from the U.S., Can-ada, Japan and several European countries. The report details the specifications of the prospective CCITT teletex standard and contains projections of how the standard will affect the terminal and word

Further, the Mackintosh International report presents tables that contrast postal, telephone and telex rates for nations that may introduce a competitive teletex service.

The report costs \$450 from Publications, Mackintosh Ltd., Mackintosh House, Napier Road, Luton, LU1 1RG, England.

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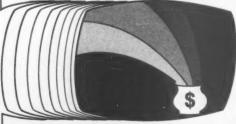
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Interim Answer to 4341s

Move to Magnuson Saves Bank 20%

CW Staff

TAMPA, Fla. - When the Exchange Bank here found that the IBM 4341 mainframes it had on order could not be delivered for at least a year, it purchased Magnuson Systems Corp. hardware - and saved more than \$120,000.

"We began looking for an interim answer," Fred Pitzner, president of Exchange Operating Services Corp., (EOSC) said. But once we found out more about Magnuson's M80/3 systems, we decided on them instead of the 4341s.

'The M80/3 systems are capable of performance that is comparable to the 4341, at about 20% lower cost — \$189,000 vs. \$250,000 per mainframe. Also, we could run our present software without making a single change."

This compatibility was critial to the decision to go with Magnuson, he added.

We still regard IBM software as critical and an integral part of our environment. We feel that paying for IBM software is a good value. "However," Pitzner forecast, "it

seems that all hardware vendors will gain advantages if their equipment can run multiple types of software.

Page 51

Exchange Bancorp., with assests of approximately \$1 billion, is the holding company for 10 Florida banks. EOSC provides DP and operational services for these banks in 25 offices as well as to 40 correspondent banks.

The Exchange Bank's hardware configuration includes two M80/3s with 2M bytes of memory and three I/O channels each, sharing more than 2.8M bytes of disk storage. NCR Corp. Criterion 8565s handle the batch processing to update master file and create the bank's Central Information File data base.

Space-Saving Beltbed Plotter Gives Flatbed Capabilities

ANAHEIM, Calif. - A space-saving alternative to large flatbed plotters has been an-nounced by California Computer Products, Inc. here.

The Model 970 plotter requires 12.6 sq ft of floor space, which can free nearly 75% of the area taken by a large flatbed, a company spokesman claimed.

The 970's beltbed design allows it to function like a drum plotter in that it moves the paper under the pen as well as the pen over the paper. However, it operates like a flatbed in that it plots on cut sheets of paper which are taped to a mylar belt running between the drum and the idler roller.

The maximum size of the cut sheets is 52 in. wide by 80 in. long. The plotter runs at up to 30 in./sec and has a drawing resolution of .00049 in.

Four pens allow for plotting in multiple colors and line widths. Depending on whether it is running in an on-line, off-line or remote time-sharing environment, the 970 can operate at speeds up to 9,600 bit/sec, the spokesman claimed.

Control Panel

The control panel provides such factors as electronic plot limit capability, return-tolast-plotted position and plot-time meter. Safety features include an interlocked, transparent shield and y-axis limit switches to keep the pens within the belt's perimeters.

"Computer-aided design and drafting, where full-size drawings are often required, is a primary target application for the 970," according to James Waltz, vice-president of

sales and marketing, Graphics Products Division. Other markets include mapping, engineering design and general drafting

As an illustration of the reported 25% to 50% cost savings which can be realized, Calcomp lists its own Model 748 flatbed plotter at \$67,000. The Model 970 beltbed plotter is available for approximately \$51,000

Calcomp is located at 2411 W. LaPalma Ave., P.O. Box 3250, Anaheim, Calif. 92503.

Further Changes

Exchange has also opted to replace its Control Data Corp. tape drives and IBM 3350 disk drives with Model 3670 tape drives and Model 8650 disk drives from Storage Technology Corp.

Another change was made by substituting ITT Courier virtual terminal line controllers for two IBM 3272 control units. The new units support both local and remote terminals without requiring any software changes.

"They also will enable us to switch applications at the terminal without physically (Continued on Page 52)

IBM Upgrade Packages Ready

SCHAUMBURG, Ill. - IBM 370/158 and 370/166 users who want to enhance their systems but would prefer not to wait several months for enhancement deliveries from IBM can get similar upgrade packages from Circle Computer Services, Inc.

The Mod I to Mod III model conversion package for the 370/158 is available immediately for \$15,200 less than the IBM list price. Delivery of the same package from IBM takes up to six months, a Circle spokes-

Circle is also offering three upgrades for the 370/168. The 168 Performance Im-provement RPQ 20573 is available in seven days or less compared with 14 months from IBM. Circle claimed.

frame, the vendor said.

The upgrades, which, in effect, expand the buffer to increase throughput, are said to be possible alternatives to users waiting for IBM's long-rumored H series of main-frames. In light of rumored delays in release of that system, Circle said the 158 and 168 upgrades may be the only hope for users who do not want to switch to the larger 30 series of mainframes for short-term computing power while waiting for the H series.

Circle's Mod I to Mod III model conversion package costs \$75,000, and the Performance Improvement RPQ 20579 costs \$115,000 (the same as IBM list price). The 7730 System 370 Extend costs \$55,000 (\$25,000 less than the IBM figure) and

VSTEWS & PERIPHERALS A Virtual Machine Assist (VMA) RPQ 20579 and the 7730 System 370 Extend package are also available in the same time VMA RPQ 20573 sells for \$80,000 (\$23,000 less than IBM list price) from Circle at 920 Remington Road, Schaumburg, Ill. 60195. arterback The Beall Channel Switch. To tell your computers where to get off... and on. Lets specific peripherals serve more than one computer. Gives you more usable redundancy, especially for critical on-line services. Provides far more flexible physical deployment of peripherals. Why Beall? It's more reliable. Up to 94 per cent fewer circuit boards than the competition. Less to go wrong. It's easier to operate. Simpler controls reduce chances of costly becator mistakes. It's simpler to service. Self-diagnostic equipment is built in. Spare parts stocked on site. We make five basic models to provide up to eight switchable interfaces each of which can be logically connected to as many as eight CPUs. On yes, one more thing. Our "quarterback's" contract is the lowest in the league. John Beall & Company, Inc. 9103 Third Avenue . North Bergen, N.J. 07047 U.S.A. . 201/854-3562

Largest Dutch Retail Group Completes Upgrade

By Ivan Berenyi

Special to CW
BIJLMERMEER, Netherlands — The
Netherlands' largest retail group will
install its third Honeywell, Inc. Level
66/10 computer system by midsummer, in the last phase of a six-year
ungrade.

Koninklijke Bijenkorf Beheer's (KBB) Level 66 will replace a Burroughs Corp. B4700 inherited when the separate computer centers of the Bijenkorf department stores and the Hema novelty chain merged in 1974. Also inherited in 1974 was a Honey-

Also inherited in 1974 was a Honeywell G-130, which has since been replaced by the exisiting Level 66 sys-

Non-IBM Gear Saves Bank 20%

(Continued from Page 51) changing ports." Jim Bozeman, vicepresident and manager of the computer center, said.

"I feel that I have the ultimate computer system," he continued. Peripheral devices also include two Documation, Inc. impact printers and four IBM 1419 check reader/sorters. The combination of vendor's products being utilized at the bank has caused no problems other than a requirement for some "diplomacy with IBM," he noted.

Bozeman speculated that the bank's current setup could result in savings of up to \$1 million during the next five years if no additions were made to the system.

DCS System

Although Exchange Bank is planning to replace three of the 1419s now in use with two Trace sorters from Recognition Equipment, Inc., it had to interface the M80s to the 1419s in the interim. This led to the development of the Direct Control System (DCS), recently announced by Magnuson for financial institutions, [CW, April 14].

The bank allowed Magnuson engineers 60 days to "put together" the microcode for the DCS. After installation, "it shook down in just two days," according to David Bercaw, senior vice-president at Exchange.

The check processing being handled with the DCS is the bank's "most critical" application. Transaction volume reaches a peak daily average of 450,000 with at least 10% growth each year anticipated for the foreseeable future.

Other applications include on-line commercial loan, corporate trust stock transfer and development of timeshared programs.

Payroll/personnel, installment loans, account reconciliation and general ledger batch systems are also running on the M80/3 mainframes.

The first M80/3 was delivered to the bank on Nov. 1, 1979. "When I saw how small the system was, I worried I wasn't getting my money's worth," Bercaw equipped. "It's smaller than an equivalent mainframes, has fewer internal connections, uses less electricity and requires less air conditioning."

When he asked the vendor about plans for dealing with IBM's forthcoming H series, the response was that up to 16 microprogram-controlled channels could be tied in to each CPU.

tems

The new computer center in this suburb of Amsterdam handles processing for the whole KBB group, including the country's Maxis and Trefcentre chains, Galeries Modernes department stores, the Perry Sport group, Praxis D-I-Y stores, Eurobee shops, a development company called Robex and the Mavo and Mavoma realty firms, besides the Bijenkorf and Hema stores.

Together, KBB outlets comprise nearly 40% of the Dutch department store market and 2.2% of the country's entire retail trade.

The decision to opt for an all-Honeywell installation was made in 1978, following a year-long study of the group's needs by consultants Arthur Anderson & Co. Central to the consultants' thinking was the estimated 14 man-years that would have been needed to convert the existing G-130 software to run on any but Honeywell machines.

The first two Level 66 systems were installed last year, backed up by two mass storage processors, eight 200M-byte disk units, four 200M-byte and two 1,600 line/min printers.

A Burroughs DC140 concentrator at the Bijenkorf central warehouse in Woerden is scheduled to be replaced by on-line terminals, and a Digital Equipment Corp. PDP-11 at the Hema warehouse in Utrecht will make way for a Level 6.

Data entry at the center is done through a 24-keystation Nixdorf Computer Corp. 620/30 system which replaced a combined Honeywell Keyplex and MDS-KDS 2400 system when the new center opened.

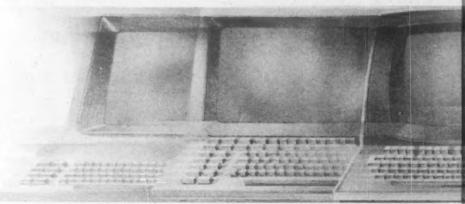
when the new center opened.

In addition, the five Bijenkorf department stores each have point-of-sale (POS) systems based on ICL (Singer) System Ten computers, while steps are being taken to equip the Maxis and Trefcentre stores with NCR Corp. 726-255 POS systems.

"There are no definite plans to install POS at the Hema stores, which have a complex order control function," DP Manager J.W. Luitink noted. "But a full investigation into the possibilities for this and other subsidiaries will be made.

"We pay a lot of attention to cost justification when it comes to POS," he

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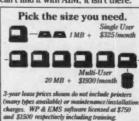
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Grows From Two Terminals to Six States

Insurer's On Line Experiment Turns Into DDP

By Marguerite Zientara

CW Staff
SAN RAFAEL, Calif. — A test program initiated two and a half years ago by Fireman's Fund Insurance Companies - involving two CRT terminals connecting agents with their branch offices - has grown into a distributed data processing (DDP) network covering six states.

Still in the test phase, the project be-gan because of "a combination of things," according to Charles Rinehart, vice-president of the firm. "We were dealing with a couple of very large agencies in Massachusetts and Arizona that we felt could justify the project in terms of volume, if anybody

"Also we felt there was a very good chance this would be the thing of the future and we'd better start getting our feet wet," he added. "We wanted to learn as much as we could about it so we could make some intelligent decisions one way or the other.

After the initial sites of Arizona and Massachusetts, the primary test sites were Alabama, Illinois, Missouri and California. In those states 42 Computer Automation, Inc. terminals were installed in six months. The number has since been expanded to "about 50," Rinehart said.

Connected over phone lines to 128K-byte CA Syfa minicomputers in the 14

participating branch offices, the terminals are used to enter data on new automobile and home owner accounts or

make changes to old accounts.

Including "all the information that normally appears on an insurance application," data input via CRT is comprised of such things as name, address and, in the case of automobile insurance, the makes and models of cars, ages of all drivers, limits of the insurance, and deductible level and the preferred payment plan..

Problems Cropping Up

As for the success of the project, the first two terminals - which were the only ones connected to one branch office apiece - "were definitely help-ful," Rinehart said. "They cut down on the work load in the agencies and in the branches as well, and there was sufficient volume to justify the expense of the terminal itself."

Currently, however, problems are cropping up when multiple terminals go into the same branch minicomputer. Consisting of a slowdown in response time, the problem is being studied "to determine if it's something that can be easily overcome or if it's a serious short-or long-term problem, or what," Rinehart said.

"Also, there are expenses involved in the terminals," Rinehart added. "The installation cost isn't too bad, the rental is relatively inexpensive, but the phone lines are expensive.

'So now we have to look at the agents now using them, and the amount of volume they'll actually be producing," he said. "I suspect there's going to have to be some sort of volume minimum before it's really going to be effective."

IBM 8100 Eyed

The branch-office minicomputers are connected to two IBM 3033 computers at Fireman's headquarters here with 12M bytes and one with 8M bytes of memory - that are used for "lots of other things" besides the test project, a spokesman emphasized.

Now under consideration to replace the CA minicomputers in the branch offices are IBM 8100s, which would have between 512K and 1M byte of memory, according to Ben Bevis, vicepresident in charge of distributed pro-cessing. While one of the reasons for the upgrade would be to alleviate the degradation problems now caused by multiple terminals going into one minicomputer, Bevis noted, "Basically, it's a long-range strategic decision.

'Of course, just because it's larger doesn't necessarily mean that it will perform better, but certainly the hope is that as we add additional power, we'll be able to have the system perform better," he said.

Although the CA minicomputers may be cut back, the total number of CA terminals is expected to expand to "around 75 countrywide within the next six months," according to Rinehart, with 40 to 50 of those located in

Interface Gives Image Capture

BOSTON - A Graphics Hard-Copy Interface (GHCI) which provides high-speed image capture capabilities without impacting the host computer's processing time has been intoduced by Adage, Inc. here.

The GHCI consists of a proprietary microprogrammed processor and expandable vector storage memory. It is available for users of Adage's 4000 series of interactive graphic systems.

The GHCl features 100-, 160- or 200 dot/in. plotter support, "strip" chart capability, and user-definable output

mapping.

The GHCI can be purchased for \$9,995 from Adage, 1079 Common-wealth Ave., Boston, Mass. 02215.

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Peggy M. Karp, Director of Product Engineering at GTE Telenet, and **Donald F. Weir**, Telenet's Director of Research and Planning, will lead this Conference, which has been completely updated to include an entirely new session on open systems architecture.

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COM and Laser Printers Save Bank Annual \$45,000



Walter J. Tiernan, assistant vice-president and manager of computer operations for Fidelity Bank, loads a roll of 105mm microfilm in the bank's Komstar 200 microimage processor.

OKLAHOMA CITY, Okla. - The elimination of off-line impact printing combined with a move to an in-house computer output microfilm (COM) operation is saving Fidelity Bank here approximately \$45,000 annually.
Fidelity Bank — with assests of nearly

\$450 million - serves as primary correspondent for about 70 smaller banks, and also supplies most of these

banks with DP services.

Stiff competition among banks and service bureaus results in a relatively small markup over actual DP costs, according to Walter J. Tiernan, assistant vice-president and manager of computer operations. Consequently, there is little room for error when the DP manager is determining the profitability formula for his department.

The problem is further complicated by many factors outside of the manager's direct control. "For exam-ple," Tiernan explained, "Fidelity's narrow, six-hour processing window sets mainframe size and other equip-ment requirements." And, "no one can control inflation, which steadily bumps up salaries and supply costs." Tiernan also maintained that "to provide a total service package, some unprofitable applications have to be offered." Finally, "paper prices are climbing 10% to 20% annually.

What can a manager do to trim DP expenses?

First, the manager can "minimize the amount of paper used by converting as many applications as possible to microfiche. He can also make sure that staff time is spent in productive efforts, and he can try to eliminate un-necessary processing," according to

Making the Transition

When Fidelity moved to implement these decisions, the first step was to totally remove off-line impact printers from its hardware configuration. They were replaced by two IBM 3800 on-line laser page printers. This resulted in improved throughput and decreased need for operator intervention.

However, "computer printout on pa-per is still far more expensive than imaging information on microfiche," Tiernan said. The bank had been using a COM service bureau for demand deposit accounting, savings and loan reports since 1974.

Fidelity performed a cost study that compared in-house costs to service bureau costs to produce the microfiche for these three applications in 1977.

CW

The bank used the Kodak Komstar 200 microimage processor as its basis for the study. Tiernan stated that Fidelity chose the Komstar 200 because it uses a dry process that does not re-quire chemicals and it operates on-line. The analysis indicated that conver-

sion from a service bureau to an inhouse operation would be a breakeven proposition for the three applications under consideration. However, the on-line capability of the COM unit made new applications more attractive, especially since the turnaround problems involved in interacting with a service bureau would no longer be a consideration.

Move to Microfiche

Fidelity added the Komstar 200 to its operating environment in August 1978. The processor was tied into an IBM 370/158 under the OS/VS1 operating system.

The bank calculated the cost of producing a 207-page report on the laser page printer to be \$6.43, while the same report would cost 84 cents to produce on microfiche. Each additional copy from the page printer would cost the same as the original. In contrast, a microfiche duplicate could be produced for 18 cents, Tiernan said.

The COM operation has also solved a storage problem for the bank's research section, which no longer needs to use remote storage space for its ex-tensive paper records.

Fidelity has begun to produce annual installment loan histories for approximately 40 banks on its loan system. "With loan information available on microfiche for each year and indexed by loan account number, banks have the information needed to establish credit rating or make loan decisions at their fingertips," Tiernan said.

Additional new applications are directly related to the DP area's work load. The bank now produces all its job control language (JCL) listings and its Syslog on microfiche.

Future plans include conversion of program documentation, listings and library to microfiche format. Tiernan claimed the JCL conversion is saving Fidelity nearly \$12,000 annually in printing costs alone.

"Any lead operator can create the parameters needed" to operate the Komstar processor, Tiernan said. He estimated that most applications could be converted from paper print-out to mi-crofiche in less than one hour.

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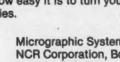
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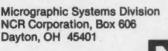
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-Amnon Ben-Yehuda General Manager NCR Micrographic Systems Division

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Eliminates Dog-Ears

Polyester Strengthens Punch and Routing Cards

BEAR, Del. — A Manhattan bank and dozens of manufacturers, retailers and assembly plants have solved the problem of deteriorating and dogeared punch and routing cards through a newly developed polyester-based card stock.

Developed by the Laminates Division of Keene Corp. here, the stock is called Astrocore and consists of a "sandwich" of high-quality bond paper on the outside with a core of polyester film.

In the case of the Manhattan bank, its Domestic Money Transfer Section needed a card stock for its DP cards that could withstand being processed 5,000 times without tearing or wearing out.

The stock had to be durable yet flexible enough to be pro-

cessed many times without causing the computer to jam, since one card may be processed as many as five or six times during a normal work-

The bank keeps track of such multiple processing by color-coding the cards with printed stripes to identify the nature of various computer printed transactions, then prepares forms on which transfers of money from one bank, corporation, stock broker or individual to another are recorded.

Cost Justification

"Although the new cards are more expensive initially than the paper cards we formerly used, we expect them to save us several thousand dollars a year," said a senior systems analyst at the bank.

The reason, according to the analyst, is that the new cards can pass through the bank's high-speed printers and automatic typing machines about 5,000 times without wearing out, while the old card lasted only about 600 times.

"This new laminate outlasts conventional cards by eight to one," the banker said. "This helps reduce the cost of duplicating worn cards, and also the reading errors and computer paper jams caused by dilapidated cards.

"Once the old cards were damaged we had to transfer the information to new cards, which took time," he noted. "Just by lasting longer the new laminate cards justify their higher cost."

Shipping Tags

A major steel manufacturer and supplier required shipping tags that could withstand a great deal of abrasion and would not fade or deteriorate when subjected to rough handling or weathering.

The manufacturer formerly used paper with a layer of laminate for protection on the outside. "But the problem was that we had to print the information on the paper and then laminate over it," the shipping manager reported.

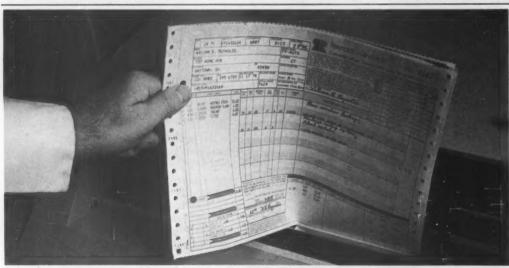
"That was an extra production step." he added. "With our new tags which look and behave like paper, we eliminate the extra step because our computers can print right on them."

The steel supplier uses Astrocore cards to identify his shipments, to tell his customers how many reinforcing rods there are per bundle, the diameter and length of the rods, the grade and bending dimensions of the steel and the part of the structure in which the rods are to be used.

A shipment of thousands of tons of steel rods may lie outside waiting to be used at a construction site for months, subjected to days of heavy rain or hot, bleaching sun.

If, when the contractor is ready to use the rods, the cards are unreadable, expensive problems can result. "No one can tell where anything goes," according to one manager at the steel company. "All the rods then have to be measured and their proper places in the construction project determined by guesswork."

Retailers, too, have found that Astrocore price tags help impede shoplifting because they have a great tensile strength, making their removal from the product more difficult, according to the manufacturer.



Push-n-pull tractors, adjustable tear bar and 1-to-9 part forms handling: all in one printer.

Finally, real-time forms access plus continuous forms output in one printer. Perfect for such applications as airline ticketing, invoicing, order preparation and more. And another example of the expanding TermiNet 200 printer family's application versatility.

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One reason: an adjustable tear bar that lets you use standard forms with different header lengths. For precise alignment, no paper waste and clean paper tear. Every time.

More reasons: servo-driven tractors that allow infinite manual adjustment in both forward and reverse. A non-volatile electronic VFU that makes forms set-up easy and permits storage of up to 8 vertical formats. A downline loading option enabling you to load formats directly from your data source. Plus straight-through paper path and push-n-pull tractors that give you perfect first-to-last-copy registration. As well as smoother paper handling for all types of forms, including single-part paper.

More features add up to more application versatility

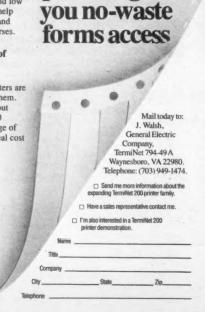
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INFORMATION NEQUALITY

The emergence of a "network marketplace" seems inevitable, but it is likely to be served by a continued proliferation of special-purpose networks serving the special needs of major firms and heavy users of data transmission.

With no strong trend toward a universal network available to all economic levels and to the public, a widening gap in the U.S. between the information "haves" and "have nots" appears plausible.

By Herbert S. Dordick

With increasing frequency, one hears concern about the growing gap between the information "haves" and "have nots." While this concern is expressed most often with reference to the developing nations of the world, a gap is also growing within the U.S.

Significant shifts in the demand for skills are taking place in the U.S.

These shifts appear to move inexorably towards the need for higher level skills in what has been called "information-based" or "knowledge-based" occupations. At the same time, there are growing minorities in the U.S. whose languages and skills are not Anglo-Saxon nor even Western-derived. A knowledge or information gap seems to be resulting fromchanging socioeconomic and cultural

Add to this the energy and economic forces that may make it more difficult for small businesses to keep up with the growing computerization of information, that is, the substitution of large data bases for magazines, and one should certainly take the possibility of information inequality in the

U.S. seriously.

It is important that the trends moving our society toward information inequality be made more explicit. If this can be done, perhaps means can be found through which policymakers can judiciously help what many consider to be a serious problem for a democratic society. This article will seek to identify the forces in operation

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and will use several possible future scenarios to describe the emerging issue of information inequality.

Network Services

An important new industry is rapidly emerging from the marriage of computers and telecommunications. This industry permits users to interact directly with one or more computers, associated data files and problem-solving algorithms from remote terminals. It may include access to distributed information systems within and between organizations, remote transaction re-cording, data base inquiry and computer conferencing. Collectively the services, products and information supplied by this industry have been called "network information services. Some of the services now being offered and growing at rates between

40% and 100% per year include remote shopping and bill paying, news on demand, electronic message delivery (electronic mail), remote medical consultation and diagnosis, electronic funds transfer (EFT), office automation, remote instruction and interactive

training and education.

Network information services connect the needs and resources of users to the capabilities and services of producers and facilitate transactions between them. All the usual services of a marketplace can be offered within a large information network.

Products and services can be adver-tised and sellers can be located; ordering, billing and deliveries can be facilitated; and all manner of transactions can be consummated including wholesale, retail, brokering and mass distribution. Indeed, the entire range of such products and services for business, industry, the consumer and government can be perceived as a marketplace - the network marketplace.

Technology factors point to a certain inevitability regarding the emerging

network marketplace. The continuing and even accelerating developments in large-scale and very large-scale inte-gration will lead to the development of increasingly intelligent terminals with considerable memory capacity. The cost of designing information-processing functions into terminal equipment or appliances continues to fall as engineers substitute information process-

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ing for transmission under the assumption that it is essentially free. The trend towards digital communications will accelerate, and terminals and terminal stations capable of dealing with intermixed signals - voice, video, image and data — are being developed.

There is likely to be a continued pro-

liferation of specialized carrier services for network applications over the next decade or so. The distinction between value-added carriers and common carriers is likely to disappear as the major carriers either purchase the existing value-added carriers as arm'slength subsidiaries or offer the same services via subsidiaries of their own as resale carriers.

AT&T's role in providing packet-

switched. value-added networks hinges on the outcome of the debate concerning industry structure and on differentiating communications and computing. It is likely that in 10 years or even less, the issue will be moot, replaced by concern with regulating communications carriers that provide network information services in a market that does not have natural monopoly characteristics as does transmission

While the cost of long-line services for the delivery of intracorporate electronic messages, office automation and EFT will continue to decline for the major users and thereby become more accessible to them, the cost of local distribution is not likely to alter very much, thereby denying access to smaller users. CATV may increase its saturation to about 50% by the late 1980s, assuming no major shifts in public policy, but is likely to continue to limit most of its services to broadcast retransmissions and subscription sports and entertainment.

The proliferation of satellite earth stations, the use of some special broadcast modes and CATV and the availability of shared-use facilities are likely to permit some general access to network services. However, for some time to come, access will be probably limited to major user of teleconferencing, electronic messges services, funds transfer and other forms of what is now known as office automation.

Equipment Trends

Innovations in terminals, intelligent appliances and telephones are likely to continue unabated. Terminals will be responsive to service needs and will drive the direction of the emerging marketplace. Extensive competition will probably continue and, because of the nature of the technology and fragmented market demands, many small

(Continued on In Depth/2)

(Continued from In Depth/1) suppliers will link themselves to special markets and clients.

A "liberated" Western Electric Co. joining the highly competitive industry can only enhance the prospects for lower cost and wider access to the marketplace.

Projections of revenue trends point to terminals, computers and software accounting for the major percentage of the total revenue developed by the delivery of network information services.

Data network traffic will probably continue to grow very rapidly over the next two decades — perhaps as much as 40% per year, some sources estimate. But even by the end of the century, voice traffic will still constitute the bulk of network traffic. While data traffic may make up approximately 1% of the total network traffic, it could account for at least 18% of the revenue.

Large investments will be required to enter network-related businesses, but the very high returns, competing favorably with those available in other sectors of the economy, could attract the necessary capital. Indeed, the revenues from the lease, purchase or rental of terminal/computer equipment can be as much as four times that obtained from the delivery or transmission portion of the marketplace.

Recently the Federal Communications Commission (FCC) issued proposed rules for governing regulated communications carrier activities in the area of network information services. The FCC's tentative decision seeks to dictate the type of DP activities permissible by carriers and the structure of the "resale" carrier market. (Resale carriers lease communications circuits from underlying carriers to be resold as components of an enhanced data or network service and are often referred to as value-added carriers.) The commission's tentative decision draws upon the findings of the Second Computer Inquiry.

Briefly summarizing the tentative decision, the communications carrier industry will be divided into three basic categories: voice service, basic nonvoice (data transmission) and enhanced nonvoice DP plus transmis-

Enhanced nonvoice network services — that is, DP and communications — may be supplied by the same carrier but cannot be provided by an entity that supplies voice or basic nonvoice service to the public. Thus, should AT&T or General Telephone and Electronics (GTE) wish to offer network services, it must do so through a separate company as a resale carrier. DP services provided by resale carriers will not be regulated, although the communications portion for resale acquired from the underlying carrier would have to be tariffed.

Finally, and of special interest to this discussion, is the ruling concerning terminal equipment. Terminal equipment is divided into two categories: basic media conversion devices/transducers and enhanced equipment

(smart terminals). Basic equipment may be provided by underlying carriers, but the enhanced equipment may not. Resale carriers may provide enhanced terminal equipment on an untariffed basis.

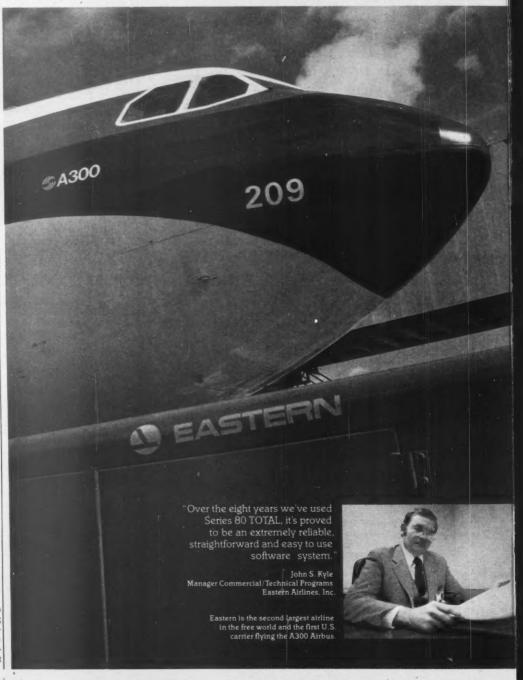
These proposals point to a world in which it will be quite profitable for industries seeking to enter the network marketplace to do so as resale carriers. Because of the continued higher cost of local distribution communications, the cost of these value-added services

will be relatively high. Except for the increased but tarriffed communications revenue that might accrue to the underlying carriers, there is little incentive for them to offer such services on the public network. Instead, they will offer network services to major users via "separate" resale carrier networks. Indeed, the tentative decision encourages this bypassing of the public network!

There is not now, nor is there in the wings, a network policy for the U.S.

The proposed Communications Act of 1979 dealt with communications as did the act of 1934. The proposed act was, indeed, a rewrite of the old act rather than an attempt to look into the future and structure a network policy for the nation.

Network services, via the marketplace, require the interaction of three technologies crossing both regulated and nonregulated industries. The common carriers are regulated, but the terminal/computer industries and the



information providers are not. Carrier services have natural monopoly characteristics, but it appears that network services may not share them.

Policy trends now in motion will favor the development of business, government and specialized large network service users. Competition under regulation is likely to continue to encourage the emergence of additional carriers for network services. While the distinction between value-added carriers and the common carriers is disap-

pearing, it is likely that the FCC will permit these services to be offered via a seperate resale approach. In any case, there will be many more private or single-purpose (or limited-purpose) networks in existence by the end of the century.

Social Values, Economies

Over the next two decades, we can expect emerging social and cultural values to create mixed attitudes toward the network marketplace. In its favor

is the fact that the marketplace is nonpolluting and energy efficient. In addition, it is supportive of trends toward the adoption of "appropriate technology" that will provide the potential for access across a wide range of economic and social levels. The marketplace requires new skills, in keeping with a trend toward continuing education and career flexibility and mobility.

The provision of network services may be labor-intensive but requires intellectual upgrading. The network can expand group interaction and create social networks not bound by geography but by areas of interest. An accessible network marketplace could create a climate in which diversity and pluralism can flourish.

However, some values may hinder the evolution of the marketplace. Computers, terminals, recorded voices and computer-simulated speech can be depersonalizing and certainly create fear and resentment among many. The adoption of services such as remote purchasing and banking may be delayed because many people perceive a depersonalizing effect.

Perhaps more important will be a continuing concern for maintenance of personal and organizational privacy. Any significant breakdown in privacy safeguards may result in more fear of the technology and of the individual's to control his own environment. And there is the fear that increasing activities on the network will lead to less personal interaction and more isolation form society.

Finally, new skills will be required, and the population will be an older one, possibly neither willing nor able to shift careers and lifestyles easily.

Chaning Demographics

As in the case of values, the nation's demographics will also create a somewhat confused environment for the network marketplace. On balance, however, it appears to be a favorable one.

Single-person households, smaller families and greater economic independence for women would appear to create a need for a more efficient use of time; as a result, networks would be used more for such time-consuming or unpleasant duties as banking, shopping and general information seeking. Female participation in the labor force will require sharing of household duties and may result in their being done at odd hours via the network marketplace. In addition despite the continuing high rate of inflation, higher personal incomes may provide more disposable income.

These factors, coupled with high education levels, might suggest a shift toward more appropriate and efficient methods of carrying out routine tasks. They could also lead to a demand for more intellectual and recreational activities to be supplied via the network, even at a greater cost than alternative modes of stimulation.

Despite some evidence of a "returnto-the-city" movement, the long-term trends continue to point to larger suburban populations at a time when energy costs are increasing. Remote transactions via the network will appear increasingly attractive as energy costs increase.

However, one cannot and should not overlook the growing numbers of elderly without increased disposable income. And, too, there is the relative growth of the Spanish-speaking populations that may not be in the network marketplace, unless there are specific

(Continued on In Depth/4)

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(Continued from In Depth/3)
policy directives that will make access
universal.

Postindustrial Society

The U.S. has entered the age of the postindustrial society; service industry expansion is giving way to information industry growth. Demands for information continue to grow as bureaucracies, both private and governmental, shore up their economic positions. Increasing labor costs stimulate the search for greater productivity, and computers appear to offer the answer. Network operations, in turn, can increase the productivity of the computer services provided.

The loss of mass markets to foreign competition has stimulated the search for more highly specialized products, and increasingly these are information products. The production and distribution of knowledge worldwide requires new forms of organizations with increased complexity, resulting from the increased fractionization and specialization of the market.

Firms cannot now easily define their markets; the U.S. and traditional world market demands are shifting in line with shifts in values and demography. To seek out these markets will require access to more and better information.

Inflation of 8% to 10% per year is expected for the next two decades. There will be a severe tightening of the money supply, resulting in less capital for launching new industries, especially if there are more attractive opportunities in other investments, such as energy. However, some segments of the network marketplace industry will offer significantly attractive returns.

Three Scenarios for the '90s

How these trends interact can best be observed through several scenarios. We have developed three: a technology-driven future, a market-driven future and a policy-driven future (which essentially emerges out of the previous two). We begin with the scenario for a technology-driven future.

By the last decade of the 20th Century, the nation will be served by a deversified, fragmented multinetwork marketplace. The number of special-purpose networks providing digital, voice, image and facsimile services in mixed as well as single modes will double and approach the neighborhood of 5,000. These networks will be largely service- and industry-specific and will include terminals with sufficient intelligence to interface with computers, networks and other terminals in similar industries and related applications.

The networks themselves will be capable of serving several related industries or applications but, in general, the network marketplace will be fragmented and serve only the needs of the major multiplant businesses and industries.

Most of the Fortune 500 companies and about one-third of the mediumsize industries in the nation will account for almost 80% of network us-

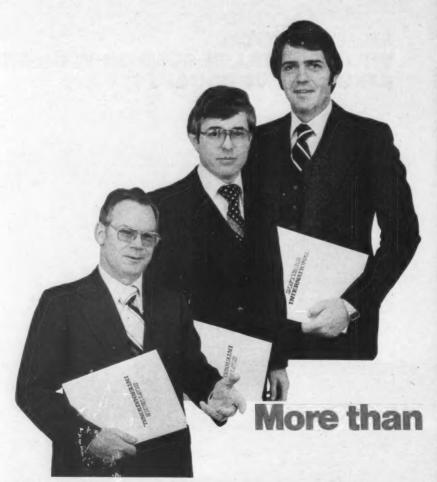
age.' A significant portion of this service will be delivered via shared networks through a resale provision authorized by the FCC in order to better utilize the satellite networks that will be in place before the last decade of the century.

Following in the footsteps of Satellite Business Systems and Xerox, other broadcast satellite carriers such as Western Union and RCA Corp. as well as AT&T will offer digital services utilizing the smaller ground terminals that will enable more industries to access a satellite. While the "final-mile" cost will be reduced somewhat, service charges and interconnect costs are both likely to remain relatively high, making it difficult for small or occasional users of network services to enter the marketplace except for special forays through a shared-use private network. The major users will continue to be the larger multiplant corporations, which will have become accustomed to intracorporate electronic

message and other transaction delivery systems with the attendant features of the automated office.

Small User's Position

Most of the smaller businesses and almost all consumers will still find the network marketplace too expensive. For example, those interested in message transmission may be willing to accept charges of between 13 cents and 18 cents per message, but the high initial cost of equipment and service/-



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interconnect charges will require a very significant level of message use in order to be cost-effective.

Similarly, those concerned with office automation may be willing to accept a transaction or message charge of between 50 cents and \$1, but only if they can perceive some significant reduction in labor, and it is unlikely that the small business or the consumer will be able to achieve such economies.

Consumers, especially, are likely to be unwilling to make the initial investments in terminals and monthly service charges unless they can access a variety of services with little or no additional expense.

Despite the growing transparency of the networks and the increasing intelligence of terminals (abetted by the availability of microprocessor firmware), consumers will still find a limited range of services available to them — possibly too limited to warrant their investment in "front-end" charges. Without a considerable acceleration in

the rate at which AT&T plans to convert its national switched network to an all-digital system'— and without the regulatory authority for a more rapid introduction of its Advanced Communications Service (ACS)— the establishment of standardized address codes is unlikely. This deficiency is likely to limit easy access by consumers and small businesses to multiple network services.

Present technology trends do not indicate a substantial reduction in the cost of local distribution charges, monthly service or interconnect charges nor do they offer much hope for the availability of highly intelligent low-priced terminals adaptable to varieties of consumer services and networks. The conditions under which universal network services at affordable rates could become a reality will only emerge from the multiple impacts of technology, the market and public policies acting in concert.

Users Vs. Used

By the mid-'90s, a situation reminiscent of the early years of the telephone will emerge. There will be many incompatible networks served by special-purpose terminals and switching systems designed to deliver services to those who can afford the entry cost.

There will, however, be a significant difference that could lead to important political actions. In the early years of the telephone, the issue was simply communications, with the value of the network dependent upon the number of people attached to it. In the '90s, the issue will be one of inequality of access to information, with the specialized networks doing quite well financially because of the valuable and efficient services they will be providing. For some time, thoughtful observers have expressed the fear that the emerg-

For some time, thoughtful observers have expressed the fear that the emerging Information Society will produce a new class of information elite*, and, indeed, there are two classes of people and businesses: the information users and the information used.

and the information used.

Evidence of this societal and economic split will become apparent as more and more small businesses fail because they can no longer purchase the information they need to remain competitive. More and more of that information will become available only in electronic form. Even now, mergers of common and value-added carriers are occurring, and a major computer/terminal network service provider has merged with a specialized carrier. (Telenet Communications Corp. is now an arms-length subsidiary of GTE and General Electric Co. has purchased Cox Cable Communications.)

Instead of decentralization and the availability of more business opportunities, the trend continues toward concentration of the components of the network marketplace. This greater concentration of intellectual power in the emerging Information Society can only lead to concentrations of industrial and financial power which are not in concert with the American economic dream.

The personal computer, while not capturing a very substantial portion of the market, will serve to demonstrate to the consumer the power of information access. (Not every home will house an identifiable personal computer, though in every home there are likely to be many functions performed by microprocessors.)

Consumer movements concerned with broadcasting and common-carrier

(Continued on In Depth/6)

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(Continued from In Depth/5) services indicate growing public interest in the widening split between the information haves and the have nots. In the mid-'90s, the issue of information inequality is likely to become one of some significant public concern, hence of political action.

The potential profit to be derived from doing business in the network marketplace will become increasingly evident as the cost of labor increases, and the same is true in the purchase of goods and services. A single purchase triggers a string of additional transactions such as those involving inventory control, delivery schedules, repair team dispatching, routing, credit checking and so forth. If the travel agent or salesclerk can be replaced by an intelligent terminal in the home or office (and with appropriate interactive software) and if the purchase transaction can, at the same time, trigger the stream of events necessitated by that transaction, the benefits to the

sellers would become substantial.

By the mid-'90s, these benefits will have become attractive to the sellers. The buyers, too, will want to conserve time and travel and seek access to the network marketplace.

However, for a marketplace to be valuable, many buyers and sellers must be able to access the marketplace. The more buyers and sellers in the marketplace, the greater its value to all. It is, therefore, important for the sellers to provide access to a large

number of potential users.

By the mid-'90s, it will have become quite evident that the cost of a network transaction is less than the cost of that same transaction - considered in all of its dimensions - performed by any other means. Projections of future costs increase this difference in favor of the network transaction. Furthermore, new buyers as well as new sellers are becoming more interested in entering the network marketplace.

However, there are high entry costs, especially for the consumer. Not only must the consumer have available a terminal capable of reaching into several networks, but there is also the problem of the relatively high cost of communications. In an interactive transaction, message unit costs as well as terminal connect times charges can

be high.

Several Possible Paths

In the last decade of this century, the market can drive the development of the network marketplace along several

1. It is expected that broadband cable television systems will have reached about 50% of all the TV households in the U.S. This represents a potential network marketplace membership of somewhat more than 50 million households. The advantages of product and service selling via the three-dimensional images of television will eventually be seen to outweigh even the lower costs of catalogs and possibly even newspapers. This will be especially true if the viewer can make a purchasing decision and take action without leaving the home or even the chair.

Major merchandisers will seek to purchase time on cable systems in the more heavily saturated markets, especially those with attractive buying powers, for the presentation of video catalogs, but on the condition that the cable system provide some means for feedback. While telephone feedback directly to the seller is likely to be used, this will not be as cost-effective to the seller as feedback via the cable to a minicomputer either at the cable headend or the seller's warehouse. Feedback via the broadband cable, utilizing digital techniques and either time- or be a great deal less expensive than the telephone. frequency-division multiplexing will

2. If, however, the sellers cannot or will not deal with the cable industry (and even if they do, at least half the households will still not be served'), it will be necessary for the sellers to utilize the telephone. By demonstrating the increased potential for the utilization of the telephone for buying and selling, sellers could create a significant demand on the telephone companies for increased local digital services at lower costs.

Furthermore, if at the same time the sellers are encouraging the cable television companies to, in effect, enter the local distribution services business. AT&T will be encouraged to accelerate the conversion of its local loop to a digital system and provide more intelli-

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gent telephones via its Common Channel Interoffice Signaling (CCIS) system. Assuming policy authorization, it is possible that AT&T's ACS (or a new equivalent) will be accelerated. Provisions for accelerated depreciation are likely to be encouraged so that AT&T can more quickly extend digital local loop services to those required by the network marketplace.

3. We can expect several major merchandisers, banks, other financial institutions and possibly the airline industry to offer their own network services. They might do this by paying the consumer's communications costs outright through the use of nationwide Wats services such as those currently being provided through the use of an 800 number. The costs of these services are likely to fall as smaller satellite ground stations become more ubiquitous and more local loops are bypassed, or at least "final-mile" cost is significantly reduced.

A seller could, in effect, create a network by providing multiple services to those wishing to utilize the communications for which the seller pays. Conceivably, the seller could also provide some sort of service, including an appliance (terminal), which would require the continued marketing of useful information or instructions for the operation of the appliance. Banking, home protection and safety services might fit that category, as will education, computer games and hobbies.

Electronic Messege Services

Electronic message services to the home will emerge as a significantly attractive market to encourage challenges to the Postal Service. In any case, the Postal Service will make some progress towards electronic mail within its own organization despite painful labor difficulties.

Entertainment services via a network, perhaps incorporating the video-disk, or more likely cable, are network services that could be provided through the growing distribution of digital networks that may be less than public but somewhat more than a private seller's network.

Finally, the several Videotex demonstrations throughout the world will certainly have an impact on the information services market, and it is very likely that a variety of information services, tied possibly to some purchasing services, will emerge during the '90s via a sellers' network.

The key issue will be: Who bears the cost of the terminal if the seller assumes the cost of the communications? If the variety of services is sufficiently large and varied, one might expect the consumer to invest in a terminal station. Whether or not this happens will ultimately depend on the offerings in the network marketplace.

4. The ever-widening availability of small earth stations with their ability to reduce "final-mile" charges leads naturally to the consideration of the future of direct broadcast satellites. They are already in operation in Japan, and there will be increasing pressure

for their introduction in the U.S.

Were this to occur, broadband access to every home would be a reality. This, of course, would compete with both the expansion of cable television and the conversion of AT&T's national switched network to digital services via the use of optical fibers.

The direct broadcast satellite is also a threat to the institution of broadcasting as it is now perceived and as it will very likely be perceived for the remainder of this century. There is and will continue to be an overriding principle of localism in this nation's broadcast policies. One can indeed argue whether in actual practice this localism is meaningful. Nevertheless, for a variety of reasons, not the least of which is the personal financial interest of many lawmakers in broadcast properties, it is highly unlikely that the direct broadcast satellite will emerge as the universal broadband network.

5. Facilitating access to the network marketplace is the business of infor-

mation facilitators (or middlemen)organizations that sell computer services rather than computers, terminals
or communications. Today these firms
offer raw computer power, packaged
or specialty software and on-line services which include access to data bases that they may or may not own.
These "middlemen" can conceivably
play a very significant role in shaping
the emergence of the marketplace.

We may expect these firms to offer (Continued on In Depth/10)

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Computer

(Continued from In Depth/7) information-providers the opportunity to market their wares in the marketplace by providing them with terminals, computers, appropriate software and procedures for accessing a network which the facilitator may assemble from existing carriers — in short, by providing value-added network facilities to the information providers.

At the same time, the facilitator might seek to assemble a network of users and purchasers for these services. This might be done by providing appropriate software to terminals that are in place or even leasing terminals to enable users to access the marketplace. Initially, facilitators might also provide the communications through a national Wats line on behalf of their providers or become resale carriers offering communications services at lower cost to users in order to provide access to the more highly valued information. The extent to which the facilitators

can reduce information inequality will, in the final analysis, depend on the degree to which the facilitators can provide low-cost local access and/or the extent to which they can recover these costs in the price of the information or services market.

Policy-Driven Future

One of the major deterrents to information equality is the lack of networks equality. In contrast to the situation in Europe, Canada and Japan, where public data networks are being developed, we have seen that the U.S. is moving toward more private networks and the services they can provide. The previous scenarios illustrate the factors that make this so.

First and foremost, one must point to the continuing high cost of local communications. While the costs of longline services have been reduced considerably over the years and promise to decline further with the increased utilization of distance-insensitive satellites, the cost of local distribution services has not gone down.

has not gone down.

In addition, there is a continuing need for special terminals with appropriate software to access the special service networks.

From the preceding discussions, three powerful forces emerge that will exert considerable pressure on the policymakers and the Congress:

1. In the last decade of this century,

 In the last decade of this century, the issue of information inequality will be raised not only by activist consumer groups but by members of business and industry who will see this inequality affecting their profits. In addition, scholars and philosophers as well as public men of principle will see this continuing inequality of access to information as a direct threat to the democratic process.

The profit potential of the emerging network marketplace will exert a powerful impetus to network expansion as business exerts pressure on the policymakers to make all 100 million households accessible to them for the sale of information products and ser-

vice.

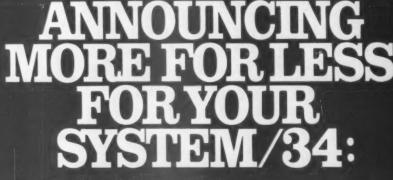
3. European, Canadian and Japanese progress towards public data networks will open them to the full force of American information products and services. It is likely that U.S. firms will find it more attractive to market their information services and products to these more easily accessible systems, adopting existing standard and essentially bypassing all but the more affluent U.S. firms while serving a more diverse set of clients overseas.

This could have, and indeed will have, a pronounced effect on U.S. and foreign productivity ratios — possibly to this nation's detriment. Furthermore, foreign branches of U.S. multinational corporations will seek to influence domestic policy in order to make it easier to do business in international information.

These factors taken together create a policy-driven future. Several alternatives for this future have already been discussed.

There are four possibilities for the future of the local distribution loop that may result in increased perfomance at lower cost — the necessary conditions for the emergence of the network marketplace.

We discount direct broadcast satellite as a serious competitor in the provision of network services. Broadcasters will argue, and to some extent with justification, that if current trends in that industry continue, the satellite will do great damage to the



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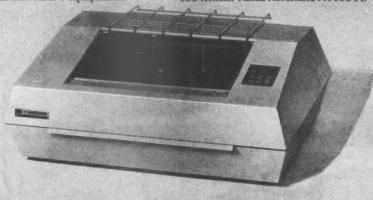
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INFORMATION INEQUALITY

concept of localism in broadcasting. While it is theoretically feasible to extend the current trend toward smaller and smaller ground terminals for point-to-point network services to rooftop antennas for small businesses and even the home, the broadcasters will argue that it will be impossible to limit their use solely to network ser-vices and that in a short time they will be used for broadcasting that bypasses the local broadcast station

2. By the last decade of the century, and assuming no government subsidy, cable television will reach a national saturation of about 50%. Indeed, we expect that by the mid-'80s, saturation will have reached somewhat more than 30% and will result in considerable interest on the part of advertisers. They will see in cable the opportunity to reach specific markets, similar to that provided by direct-mail marketing.

This may increase the rate of cable saturation, but unless there is a very significant introduction of major new services, possibly those described in the preceding market-driven forecast discussion, there is little likelihood that the 50% penetration estimate will be exceeded. This by itself will not produce a competitor for the local loop distribution system. Cable will have to provide two-way interactive capability that is highly reliable. This will require design standards of somewhat higher quality than those required for retransmission of broadcast television or Pay-TV. Some firms, such as Warner Communications, are now offering two-way services.10

By the mid-'90s we would expect several additional cable television firms, perhaps having merged with computer or terminal firms, to offer network service capability at the local loop. But without some forms of government support, it is unlikely that cable will emerge as a meaningful competitor that might create an environment that could lead to reduced costs.

3. In the mid-'90s there will be increasing pressure for universal net-work service access. Congress will be asked to declare a universal network access principal at "affordable rates" much as it did when promulgating the Communications Act of 1934 with respect to telephone service. Pressures will emerge not only from consumers but also from business and industry seeking access to a ubiquitous network marketplace open to all.

One way of moving towards this goal is to permit AT&T to pursue its ACS

ninterruptible vstem **Clary Corporation** objectives. We foresee this possibility occuring in conjuction with the sepaof Western Electric from AT&T. This is likely to occur by the mid-'90s and will be preceded, certainly before 1985, by the approval for AT&T to pursue its ACS objectives, but via a separate arm's-length subsi-dary, thereby setting a pattern for con-tinuing competition under regulation in the network services business.

By the mid-'90s, AT&T, SBS, Xerox Corp., several major CATV companies, GTE and possibly one or more specialized carriers will emerge as the major network providers as resale carriers. While it is quite unlikely that the Telecommunications Act of 1980 will be enacted into law even by the mid-90s, several elements of the proposed act are likely to be in place. Most significantly, the Universal Service Compensation Fund (in the above cited Telecommunications Act of 1980, this fund is referred to as the National Telecommunicatons Pool) which, as it is

currently written, applies only to tele-phone service, will be expanded to include network services.

By the mid-'90s, all of the carriers, including the cable television companies which will be classed as common carriers, will be recipients of the fund in order to provide universal network services at affordable rates. Competivalue-added markets, will thereby be (Continued on In Depth/12)

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(Continued from In Depth/11)

extended into the local loop.

There is little likelihood that this nation will be served by a single unified network. The pressures noted in the technology and market-driven forecasts will encourage universal network access but will also seek some assurance from its provision by a monopoly carrier.

For many years to come, the network services industry will require constant

innovation, and there is considerable doubt that such innovation can be provided by a monopoly carrier. One can and should raise the question of whether there will be sufficient capital for research and development in the network services industry if there is no single large carrier from which the high cost of research can be derived".

However, the major network infratructure is essentially in place; indeed a major portion of that structure, the

satellite, was developed almost entirely by federal defense and National Aeronautics and Space Administration monies. The research necessary to support the emerging network marketplace is likely to be less capitalintensive, concentrating primarily on terminals, computers, microprocessors, applications and languages.

4. A fourth option, however unlikely, should nevertheless be considered. It is conceivable that there will be no candidates to compete for the local distribution market. The returns in other areas of the network services market—in terminals, services, specialized networks and so forth may be much more attractive than the returns from serving the local loop. Indeed, it is likely that should AT&T enter the network markets in a competitive manner through a seprations policy, it too will seek relief from having to provide less profitable local distribution services.

After all, data services offer very significant returns, and from a return-on-investment viewpoint, firms may wish to concentrate on this market—firms including AT&T. Furthermore, if the returns on local distribution services do not warrant the entry of competitive companies, the local loop may be relegated to a nationalized form of operation.

Frightening Prospect?

The notion of a U.S. postal, telephone and telegraph authority (PTT) is frightening to many and is extremely unlikely in this century. Any form of PTT would be compared to our own Postal Service and to European systems which are, clearly neither as efficient nor as inexpensive as our system. But they emerged out of en-

tirely different traditions.

There is not reason to assume that a U.S. PTT, built on the careful structure established by AT&T as the most efficient telephone system in the world, must necessarily crumble if managed by the government. The incentive for maintaining a high-quality system is the efficient and profitable access to and use of a network marketplace, and everyone benefits from this marketplace. For without the local distribution system, profitable and universal network services could not be delivered. Information equality via network equality is in the national interest.

Likely Future

There is likely to be a continue, proliferation of special-purpose networks serving the special needs of the major firms and heavier users of data transmission. Rather than a trend towards a unified network, there is likely to be a sort of federated approach, a collection of cooperating networks that will communicate with one another because of a common interest or service need.

These federations might be assembled on an industrywide basis, such as for airlines, oil companies, food merchandisers, general merchandisers, insurance firms, the automobile industry and the like. Smaller groupings comprising scientific users, schools, hospitals and so forth might very well follow.

At the present time, what is not evident is a strong trend towards a universal network available to all economic levels and to the public. The European pattern is not being followed in this country, and barring any major change in policy, is not likely to be emulated. Instead, there will be continued dependence on market demand, which will initially be felt in the business and government sectors. Small business and consumer access are not likely to be generally available before the end of the century.

Government Intervention

There may be increasing consideration of some form of government intervention in the sector that houses the providers of information, services and goods for sale on the network. This will be precipitate by the increasing awareness that this nation has not established provisions for information equality.

Some networks might be established by creative merchandising organizations, but these are likely to serve rather narrow groups of customers. It should be remembered that, for a market to function efficiently, there must be many buyers and sellers available to each other.

A vigorous demand for universal network services is unlikely. Indeed, even if this demand peaks in the mid-'90s, it may be matched by the more-or-less normal reconstruction of the existing common-carrier telephone network into a network for digital voice as well as data services. It is likely that acce-

(Continued on In Depth/14)



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(Continued from In Depth/12) lerated depreciation rates for the carriers will be allowed so that this trend can be speeded up should the need oc-

Alternatives such as the establishment of a U.S. PTT, while interesting in the abstract - especially if the carriers do create separate firms to compete in the network services and terminals areas - are unlikely in our society. However, should the concept of universal and equal access to information become an important social, economic and political cry, such government actions are not to be entirely discounted.

Footnotes

1. Electronic Message Systems: The Technological, Market and Regulatory Prospects, Kalba Bowen Associates, et. al. Submitted to the Federal Communications Commission in fulfillment of FCC Contract No. 0236, April 1978.

3. Bell System Technical Journal, Vol-

ume 57, No. 2, February 1978.
4. Nora, Simon and Minc, Alain:
L'Information de la Societe, support a M. le
President de la Republique, La Documente-

tion Francaise, Paris, Janvier 1978.

5. A rationale for the British Post Office development of Prestel was to increase the utilization of the telephone in the UK.

6. Cable television remains a service pur-chased by middle and upper middle income families. Furthermore, since CATV systems are franchised for specific areas in a city, its demographics are known quite ac7. Interest by major merchandisers in ca-ble could stimulate the growth of cable if operators choose to provide the somewhat more sophisticated electronics required and

more sophisticated electronics required and intelligently market the new prospects.

8. Consat has announced that it will seek FCC approval to offer a direct broadcast satellite for the delivery of subscription television services. It forecasts offering to the public a small one-meter dish for shout \$3.00 in 1023.

about \$300 in 1983.

9. Dordick, Herbert S.; Bradley, Helen G. and Wyde, Richard S.: Maximizing Di-versity in Public Broadcasting Through Satellite Technology, A Report prepared for KCET, Los Angeles, with funding by the Corporation for Public Broadcasting,

1977.

10. In Columbus, Ohio, a system known as Qube offers viewers limited options for "talking back" to their television sets. Viewers can select movies, respond to polls, second-guess football and basketball referees and play games. There is still some uncertainty about how to use two-way in-

11. In 1977 the budget of the Bell Telephone Laboratories was slightly over \$900

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Herbert S. Dorick is director of the Center for Communications Policy Research of the Annenberg School of Communications at the University of Southern California, where he is also a

visiting professor. His research and teaching activities are in the areas of communications technology, communications policy analysis and systems planning with emphasis on common carriers and computer communications networks, cable television satellites and nonbroadcast systems, international communications and public television.

Dordick is the author and editor of Several books, including The Emerging Network Marketplace (with H.C. Bradley and B. Nanus), which will be published this fall, by Ablex Publishing Corp.



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Illustrations of needs for more reli-

communication between people working on the same software system.

Here are three hypothetical case histories of management problems in such an environment. Cases 1 and 2 are examples of the elementary integrity problems. Case 3 is a simple exam-ple of the "signature" problem, in which accountability as well as integrity must be preserved.

Case 1: It is three days before scheduled system acceptance tests, and preliminary testing has located errors in the terminal support routines. The software begins round-the-clock operhas been substituted in the system.

Case 3: Company D contracts with a government agency to deliver a oneof-a-kind software package and commits to its correct operation for one year after acceptance of the package. Nine months later the agency, which maintains an in-house software staff. reports failures in the system. Company D's programmers insist that their code must have been modified in damaging ways since delivery but cannot prove their case. Company D is left with the bill for finding and fixing the

How can programming managers and data users assure that a particular segment of a program or data contains exactly the currently-correct authorized information? While distinct from the usual "security" applications of cryptography, this problem can be solved conveniently and economically with highly nonlinear cryptographic algorithms.

able content authentication will be drawn from two particular areas of information processing. We will describe a simple technique which, carefully applied, can be effective in improving management control in those areas.

Problem Area A: Software System Development and Maintenance.

Managers of software projects might need to authenticate information segment contents because:

 Complex software systems consisting of many interrelated program elements and data structures are undergoing continual upgrade while continuing production operation.

 Access to the system must be pro-vided to "friendly" programmers and technicians who are responsible for performing upgrades of specific system segments but who may not be cognizant of all actions of other staff members.

Serious constraints on time for development, test and integration inhibit

ation to accomplish the fix. The final patch is made with one day to spare and an exhausted team compiles, loads and stores the modules for the integration team.

Upon integration, the system will not execute. After intensive debugging, it is found that the integration package contains an obsolete version of one of the new modules which was included by accident.

Case 2: Company A builds a data reduction package for company B who then markets it to company C. Company C proceeds to tailor the delivered package for its users. After 18 months of operation, the package suddenly be-

A careful examination of all recently added software fails to detect the error and company A is finally brought in as consultants to solve the problem. It is found that an obsolete version of the data base structure, differing from the correct version by one word, somehow

In each of these cases, what was needed was not a technique for protecting the system from hostile users or invaders, but one that provides quick and reliable verification of the integrity of the overall system and of its various components . . . or an alarm indication and a pointer to a suspect system component,

The lack of management control illustrated by the examples above can cause countless small delays during the development of large software systems as well as considerable embarrassment when the reasons for these delays must be explained to upper level manage-

ment and customers

The costs for failure to recognize the changes in software are seldom as obvious as in cases 2 and 3. Often these costs are merely merged into the costs for package development, the delays caused are absorbed into the development schedule and top management is

(Continued on In Depth/16)

IN DEPTH

(Continued from In Depth/15) not informed that the problems existed. After the error has been found and fixed, only rarely is an inquest held to identify this contribution to "the high cost of software."

When the integrity problem is explicitly recognized, a solution is readily available, as we shall see.

Problem Area B: Distributed Data Bases in Advanced-Technology Sys-

The very success of automation

promises to make error detection and control an increasingly serious problem in the 1980s. This is true for military systems as well as for commercial systems. The problem is exacerbated by the proliferation of small computers supporting decentralized operations, a rapid trend toward internetting and distributed computer operations and micro-miniaturization.

These trends are likely to increase both the number of undetected data errors in a system and their criticality. Some of the reasons for this projection

Intercomputer operations (as opposed to stand-alone operations) inherently involve more communications, more interfaces, more exposure to transient effects such as noise or power variations, more processing of the data, increasing complexity of links in a system (example: replacement of simple circuit-switched and store-and-forward networks by packet-switched or time-division-

multiplexed networks, controlled by vastly more complex operational software and firmware) and more remote data bases that contain the same files. All of these factors will increase the likelihood that errors or inconsistencies will be introduced into data, however accurate the original data when captured at some source point.

One special problem involves the maintenance of redundant data bases at separated locations: When an error is discovered at one location, then all become suspect. Whose file is correct? More urgently, how can errors or unauthorized changes be discovered quickly?

• As technology proceeds toward widespread use of very large-scale integration, including charge-coupled devices (CCDs) and similar densely packed components, there is a greatly increased probabilty of data "soft failure" as a result of cosmic radiation or natural radioactivity. (A soft failure inserts on error in the data but the device continues to function and the error may go undetected.) Radiation thus causes about three soft failures per 1,000 hours in a 256,000-bit CCD."

Similar effects are visible in even present-day hardware, when tests are large enough and sensitive enough. During extensive testing of one commercial bank cryptosecurity system in 1977, using a procedure that could detect one-bit errors, one of the authors (HSB) encountered three soft failures in about 40 million encrypt/decrypt operations. The hardware to which the errors were traced was found not to be defective.

 Survivability of data in military and space systems, in particular, may become a greater problem as these denser electronics are adopted. More intensive radiation effects and more frequent soft failures could be expected during nuclear war or in the space environment.

There has been substantial progress in radiation hardening of components and subassemblies. Consider, however, the radiation-effects of a nuclear weapon on very-high-density circuitry in space. A burst of initial errors caused by high-level prompt ionizing radiation could be followed by continuing soft failures, independent of further external radiation, from low-level radioactivity in the hardware itself that has been induced by the neutron flux.

Traditional Methods for Information Segment Content Authentication. The most obvious correctnesschecking technique is to compare a

suspect copy against something else ... but against what? Is an archival copy really more reliable than one that has been used successfully? Costs for storage space, particularly for sensitive data, can become excessive. Keeping track of backup file history can generate new questions and problems. For distributed data bases, communicating entire files between locations can be high in cost and questionable in reliability.

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IIN DEPTH

nique we recommend has been used for centuries. It has been applied by simple arithmetic procedures known as checksumming, hashtotaling, crossfooting, check-digit or redundancy

checking.

These linear processes are, unfortunately, limited and to some extent tunately, limited and to some extent unpredictable in their ability to detect

error or change in data.

In recent years there has been widespread adoption of more effective cyclic redundancy codes (CRCs)2 in communication systems. There has also been significant use, principally in storage hardware, of data encoding schemes that can provide limited error correction as well as some error detection. These improved coding schemes are still subject to finite probability of failure to detect error. Because they perform fixed transformations on data, they do not provide means for establishing accountability and control over data change; in cryptography jargon, they have "zero key length."
Requirements for Information Con-

tent Authentication.

In order to provide effective answers for the problems outlined above, a technique should have several characteristics:

· The probability that an error or change, however small, will not be detected must be made vanishingly small

• The process should permit each copy of a data segment to be validated by reference to something contained within itself. Although this requires that checking data must be added, the amount of space expansion should be small be comparison with the working

· The process should be end-to-end; it should not fail because of incorrect data transfer through any link in a net-

work, however complex.

• Validity of the checking process should depend only upon a mathematical relationship that can be verified readily in any desired hardware-software environment.

· In order to compare copies at different locations, only a single transmission of a relatively small amount of data should be required.

· Accountability and control should be possible through a mechanism that does not depend upon control tables, but is implicit in the checking information itself.

• Time and cost for a segment-check should be low so that such validation can be performed on a routine basis.

All of these requirements, taken together, can be met by use of a kind of mathematical process that has become available outside the classified military community only since the mid-1970s: highly nonlinear transformation of data by use of keyed cryptographic algorithms.

Detection of Data Change.

Strong encryption/decryption ("cryption") transformations can be applied to input data segments of any length in a manner that provides "unlimited forward stream garble extension": Any change in input data effects all corre-

sponding output data after the point of change. This characteristic permits an entire data segment or stream to be validated by examining only a relatively short field at the end of a crypted version of the segment or stream.

For the purposes of this validation, the privacy aspect of encryption (pro-tection of information against un-authorized inspection) is irrelevant. The objectives are integrity (protection of information against undetected change) and accountability (auditability of personal responsibility for an action); we define authentication as confirmation of integrity and accountabil-

cryptographic transformation output may therefore be discarded, except for a selected short field at the end which becomes the authentication field (AF).

Basic Technique for Segment Con-

tent Authentication.
The required steps for content authentication by the recommended

technique are:

1. Generate an AF by executing a specified nonlinear algorithm on the contents of the information segment. Store or transmit the AF with the information segment.

2. On subsequent reuse of the segment, generate the AF again and compare it against the previously generated AF

If and only if the previously and subsequently generated AFs are equal, the (Continued on In Depth/18)

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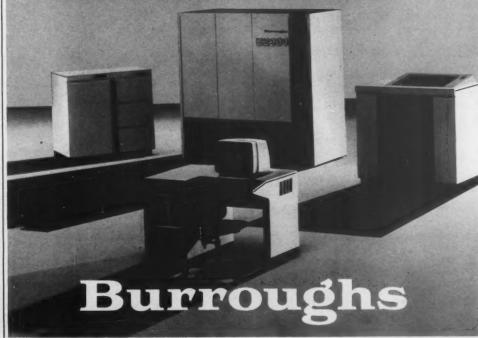
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IN DEPTH

(Continued from In Depth/17) segment is unchanged.

Accountability by Control Keys. Each of the modern cryptographic Strong Algorithms has the remarkable characteristic that every possible value of Control Key' causes the algorithm to execute a distinct nonlinear mathematical transformation upon data supplied to it. These algorithms are deterministic: A particular algorithm applied to a particular algorithm aunder control of a particular key,

produces one and only one set of out-

Because of the uniqueness of each key-controlled transformation, if an AF for a given segment is generated first under one key and then under another key, the two AFs will be totally different. If the two AFs are the same, it is safe to assume that both were generated under the same key.

This characteristic permits assignment of a key to a person or to an organization to provide management

control over the generation of AFs from information segments. High-level key control can be performed by key-management processes which themselves use cryptography. Such procedures are beyond the scope of this article.

AF Generation Procedure.

An efficient and change-sensitive procedure for generating an n-bit AF is to crypt an entire information segment, using a keyed cryptographic transformation that provides unlimited forward stream garble extension. The final n bits of the crypted result are the required AF; the remainder of the result of cryption is discarded. Every bit of the AF so produced will be a function of every bit of the information segment.

Design criteria for this procedure are:

• The AF must be long enough so that equality-by-chance of AFs for different segments is highly improbable. A length of four to eight bits, as is used in traditional check-digit procedures, yields one chance equality in 10 to 256 random AFs and thus is inadequate for any of the problems discussed here. Sixteen bits (one in 10°), as used in the Swift network for international banking communications, is marginal. Twenty-four bits (one in 10°0), the minimum specified in FS 1026°, is much safer. Sixty-four bits (one in 10°0) is safe for almost any purpose.

• The nonlinear transformation algorithm, as it is applied in generation of the AF, must provide unlimited forward stream garble extension. If DEA is used, the usage mode must be one of those that provides that characteristic (for example, cipher block chaining mode, but not cipher feedbacks or output feedback modes^{5,6}). QIK-Crypt, used directly, has the required behavior.

 If segment length is not an integral multiple of 64 bits and if DEA is the crypting algorithm, the procedure for its use may require padding the final subsegment out to 64 bits. QIK-Crypt maybe used directly on an information segment consisting of any number of eight-bit bytes.

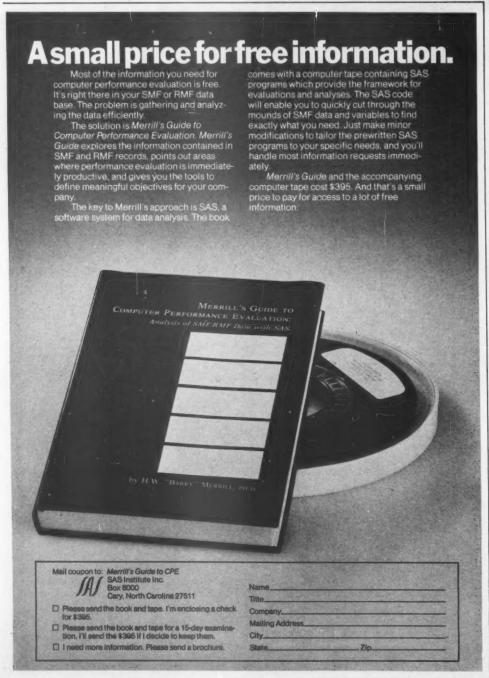
Remote Authentication.

The content-authentication process outlined above, if extended to include a representation of the control key encrypted under some other key, together with authentication of the entire identifier-key-AF message, can be used for comparing separately located copies of an information segment of any size by transmitting only a few hundred bits one time. One convenient protocol uses a 256-bit message consisting of four 64-bit fields (identifier, encrypted key, pregenerated AF and message AF).

If it is desired to use an AF of marginal length (one that is substantially shorter than 64 bits), we urge that the procedure be tested carefully with a large population of randomly generated test information segments of appropriate lengths, some differing in only one bit and some with only resequencing of a bit pair, a byte pair or (if DEA is used) a 64-bit-block pair. This is also a good check on the sensitivity of the entire AF-generation process.

There should be no duplicate AFs. If a short AF is chosen deliberately, the tolerable level of false-duplicate AFs should be decided upon and validated in the testing. We suggest that a nominal level of one in a million false-duplicate AFs is a reasonable minimal level of performance for the process. If choices are DEA (used properly) or

(Continued on In Depth/20)



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IN DEPTH

Continued from In Depth/18) QIK-Crypt, and a 64-bit AF, it is unlikely that any amount of testing will disclose any false-duplicate AFs.

Choice of Segment Size and Scope. When planning use of content authentication, a user must determine how closely it is appropriate to localize information change. Questions to be answered include:

· What are the natural sizes of pro-

gram and data segments?

Should global as well as local authentication be performed?

 Should authentication change as a system approaches deliv-

 How frequently is it acceptable to require reauthentication because of authorized change in a typical information segment?

· Should arbitrary upper limits be placed on authentication segment size, as a function of system conventions for buffer or record size, user restrictions, end-to-end encryption procedures, if used, or special space limitations in an on-line environment?

In typical applications, AF storage will expand space requirements by less than 1%; thus, space economy is usually not an important planning considCosts of Use.

Nonlinear algorithm usage can be provided by several kinds of hardware, by firmware or by CPU-executed software. Costs will be discussed here for processing under com-mercially available cryptographic support software.

The principal execution cost in a central-mainframe system is CPU time charges for execution of the nonlinear algorithm part of the content-authentication process. Let us assume use of an Amdahl Corp. 470 V/6, that the price is 50 cents per CPU second and that the typical segment length is 10,000 bytes.

The CPU cost and time to authenticate a new segment or to recheck a previously authenticated segment will be 13 cents (.25 second) using DEA or 1 cent (.02 second) using QIK-Crypt. Incidental costs for segment location, loading and AF testing are ignored

Content-authentication of the same segment in a second location will require also that the 32-byte message described above be communicated, at commensurate cost, to the second location and that the segment AF genera-tion be performed there. We believe that costs of this order of magnitude will not discourage use of content authentication.

Reference and Notes

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2. Peterson, W.W., and D.T. Brown, "Cyclic Codes for Error Detection," Proc. IRE, Vol. 49 No. 1, January 1961, pages

3. Bright, H.S., "High-Speed Indirect Cryption," Technical Note 913-35, revi-sion of Oct. 5, 1979 '8 Computation Planning, Inc. (Complan).

4. A key is a datum that may be as short as 16 bits (as in several retail credit card and debit card PIN protection algorithms); more commonly is 56 bits or 64 bits (DEA); may be 128 bits (QIK-Crypt) or up to

2,048 bits (various military crypto machines). DEA is the Data Encryption Standard Algorithm (Fips PUB 46, NBS, 1977). QIK-Crypt is a variable-block-length cryption algorithm developed by Complan. Both DEA and QIK-Crypt are commercially available from Complan in the Cryptopak cryptographic R&D support software system and also in its application subset package Desaik.

5. Proposed Federal Standard 1026, NBC, 1978, '2.3 (CBC Mode) and '2.2 (CFB Mode) Feb. 2, 1980 Complan.

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cryption Standard," NBS Special Publica-tion 500-27, U.S. Department of Com-merce, pages 60-62 (OFB Mode as cur-rently identified is called "internal feed-back" in this senses?

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Herbert S. Bright is president of Computation Planning, Inc., an analytical and software firm in Bethesda,

Bright has been president of the firm since 1966, but since 1974 he has been primarily concerned with information privacy, integrity, accountability and authentication. Previously he headed a large-scale manufacturer's product line software development department and an industrial computing laborato-

Bright has been elected to office in Share and the Association for Computing Machinery, has published 33 technical papers on computing and has one U.S. patent pending. He holds an M.S.E.E. degree from the University of California.



Kenneth L. Moll is president of Strategy Corp., Arlington, Va., a firm spe-cializing in studies of national security policy, command and control and trends and applications for computers and other advanced technology.

Moll is a retired Air Force colonel

who, from 1950 to 1975, served in a variety of Air Force assignments. He has written extensively on military his-tory, strategy and technology.

Moll holds a B.S.E. degree from West Point and an M.A. from the University of Omaha.





Dr. Richard A. Harris is a principal engineer of command and information programs with HRB-Singer, Inc., State College, Pa.

With a background in software design and mathematical research, he is responsible for minicomputer-based systems that fuse and report in real time data collected by automated sensor systems. He has written extensively on symbolic algebraic computer manipulation techniques.

Harris holds a Ph. D. degree from New Mexico State University.





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Waiting to See What's on Tap

Users Not Stampeding to 370-Type Minis

By Tim Scannell CW Staff

Minicomputers that run IBM 370 software and function like large machines — but at a fraction of the cost — may seem like a good idea. However, users aren't stampeding to buy these technological mimics, according to one 370-compatible systems builder.

IBM "still has another shoe to drop," William Parks, vice president of Kardios Systems Corp., said in reference to the impending introduction of the 4336 processor and hints of a new IBM mainframe series. "People are just waiting to see."

Located in Gaithersberg, Md., Kardios became one of the first companies to enter the IBM software emulation market when, in early 1978, it unveiled a minicomputerbased system that reportedly matches the performance of IBM's 370/135 and 370/138

Mass Storage Unit Gives VAX-11 More Than RH780

SUNNYVALE, Calif. — A high-performance disk mass storage system that reportedly provides 50% more capacity per spindle for the Digital Equipment Corp. VAX-11/780 than DEC's RH780 storage device has been introduced by System Industries.

The system basically consists of one or more 300M-byte storage module disk (SMD) drives, a Model 9400 controller and a four-board synchronous backplane interconnect adapter module that plugs into the VAX-11/780 CPU. The storage system was designed for applications requiring large, active on-line data bases, a System Industries spokesman said.

In operation, the System Industries system emulates DEC's RH780 hardware and RM03 software at the operating system level. With the 9400 controller, the user can select from a variety of interface opinions and system configurations, including dual channel drives and multiple CPUs, the spokesman claimed.

In addition, up to eight disk drives can be interfaced to the VAX in a daisy-chain setup, providing a total of 2.4G bytes of online storage. By contrast, the largest RH780 system provides only about 1.6G bytes of storage and is not geared for multiple-CPU configurations, the spokesman said.

A single-drive Systems Industries storage system costs \$36,500, while a dual-disk version sells for \$53,900 from the vendor at 525 Oakmead Pkwy., P.O. Box 9025, Sunnyvale, Calif. 94086.

mainframes. Some of the firm's technological peers includes Two Pi Corp. and Formation, Inc., a 10-year-old consulting firm that just last month introduced its version of a 370-compatible weapon against the IBM system giants [CW, March 31].

Costs 75% Less

Kardios' system, built around Perkin-Elmer Corp.'s 32-bit 7/32 machine and incorporating specialized firmware, runs IBM software with slight modifications from an object code level, Parks stated. More importantly to the user, though, the enhanced minicomputer with 250K bytes of memory sold for about \$49,000 when it was first introduced, approximately 75% less than IBM wanted for a 370.

Since the system's debut, about 20 Kardios-equipped 7/32s have been installed, several at government-operated sites. In the past few weeks the company has shipped two beefed-up versions of the 3220, Perkins-Elmer's top-of-the-line minicomputer. Kardios also has a couple of in-house orders of the 3240, the minicomputer vendor's newest machine.

So business has been relatively good for a company of Kardios' size, Parks noted, but the image of IBM's technical and marketing sword is always present. Basically, Kardios

Reason to Switch: Not Just Price

By Tim Scannell CW Staff

MILWAUKEE — Although cost is a major reason why most users pack up their programs and move from an IBM 370 mainframe to a 370-compatible minicomputer, other factors could also motivate such a software shuffle.

Last year the Milwaukee County Federated Library System turned its back on a dual IBM 370/145 and 370/156 system on which it was renting time and installed a Kardios System Corp.-equipped Perkin-Elmer Corp. minicomputer system consisting of both a 7/32 and an 8/32

The library chose the Kardios approach because it enabled the library to have its (Continued on Page 59)

has survived this far by appealing to the user's pocketbook and offering more system control than a user could get with an IBM (Continued on Page 59)

Qantex Kicks Off Printer Family With 150 Char./Sec Device

HAUPPAUGE, N.Y. — Branching off from its usual concentration on data storage devices, Qantex has announced the first in a series of printers aimed at small business systems and local computer applications.

The bidirectional, microprocessor-controlled Model 6000 is a serial dot matrix impact printer with a 136-col capacity and a printing speed of 150 char./sec. Its print head uses a 9 by 9 matrix format that creates full lower case descenders; the printer also provides an underlining capability.

The Model 6000 incorporates "look ahead" logic that decides whether to start each new line from the left or the right side of a page, a spokesman noted.

The printer is supplied with either a Centronics Data Computer Corp.-compatible parallel interface or a serial RS-232C interface that operates at \$\tilde{\alpha}_{\tilde{\chi}}200\$ bit/sec. A 240-char. buffer is standard, but the user can optionally implement a larger buffer if necessary, the spokesman said.

The printer handles paper ranging in width from 2 in. to 17.5 in. and prints multipart forms up to six parts. The 6000 also has

a vertical forms control, provides an adjustment for impression control and has a builtin out-of-paper sensor.

The printer can not only be used with stand-alone minicomputer systems, but can also provide hard copy from CRT screens used in data entry systems and print output from remote job locations.

The Model 6000 costs \$1,395 from Qantex, a division of North Atlantic Industries, Inc., at 60 Plant Ave., Hauppauge, N.Y.



Qantex Model 6000

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Controllers Emulate RK611/RK06 Subsystems

SANTA ANA, Calif. — Emulex Corp. has unveiled versions of its SC01 and SC11 large-disk controller that are said to allow users of Digital Equipment Corp. LSI-11 and PDP-11 computers to emulate DEC's RK611/RK06 disk subsystems.

The SC01/C and SC11/C controllers emulate all operations of DEC's RK611 disk controllers and are intended to support such cartridge module

disk drives as Control Data Corp. CMD9448s, Century Data, Inc. Hunter models and Ampex Corp. DFR900 series devices.

The Model C controllers map a logical RK06 14M-byte format onto each recording surface of the disk drive, allowing the user to transfer complete logical blocks between the fixed and removable media within the drive, a spokesman said.

The controllers duplicate the architectural features of the equivalent DEC subsystems, including both diagnostics and operating system software.

The controllers reportedly offer the same features as DEC's RK611/RK06 subsystem, including separate disk drive registers, rotational position sensing, error-reporting functions and dual-port drive operations, he added.

The controller's firmware provides three-sector disk I/O buffering. Successive multiple adjacent sector transfers across tracks in the same cylinder are handled without sacrificing disk rotation or requiring a sector interlace scheme, the spokesman claimed.

Finally, the units provide either a two-word or four-word

transfer per bus grant.
The SC11/C and SC01/C are

available for immediate delivery, but prices are not yet available from the manufacturer at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Intel MPUs Gain 1M Byte Add-On Memory

SANTA CLARA, Calif.

An add-on memory system that provides up to 1M byte of storage for Multibus-compatible single-board computers has been introduced by Intel Corp.

The ISBC 090 plugs directly into a single card slot in the Multibus backplane and can be shared by a variety of Intel single-board computers. The memory system has two components: a Multibus interface board and a Series 90 rackmountable or table-top memory system.

The interface board contains two eight-position switches that let the user assign starting and ending addresses to the memory; byte swap circuits match the protocol of 8-bit and 16-bit data transfers into and out of memory to the protocol of the master.

The Series 90 contains up to four memory modules that store 256K or 128K bytes of data; a control interface module that incorporates error checking and correcting circuitry; and an error logger and display that can record up to 4,096 errors and indicate the defective memory area.

Covered by a 90-day warranty, the ISBC 090 costs \$16,690 in a typical 512Kbyte configuration. Intel is located at 3065 Bowers Ave., Santa Clara, Calif. 95051.

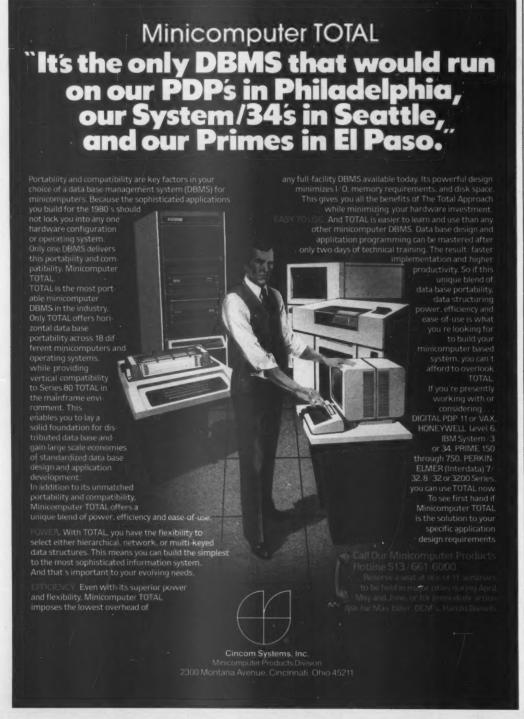


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Users Not Rushing to Buy IBM 370-Compatible Minis

(Continued from Page 57) mainframe.

For instance, a Perkin-Elmer 3220 with Kardios firmware is said to be in the performance class of an IBM 370/145 and have four times the power of a 4331. But a 500K-byte 3220 costs \$5,000 to \$10,000 less than a similarly configured IBM 4331, Parks pointed out.

IBM "just cut the legs off everybody except the peanut guys like me that are selling way down at the bottom end of the mud," the Kardios vice-president commented. "The bigger companies are probably just afraid to compete

Not Afraid of the Water

Still, at least one fairly large company is not afraid of swimming against the IBM tide. Very much on its feet in the 370-compatible market, Two Pi sells its system by hawking the advantages of being able to use a plethora of IBMaimed software packages.

To date, the firm has considerably more than 100 users of its V/32 370/138-class - minicomputer, according to Jim Geers, Two Pi's vicepresident of marketing.

Aimed at the OEM market and sold through National CSS, Inc., the V/32 is presented to the user as a turnkey system. Unlike the Kardios offering, Two Pi's system is completely soft-ware-transparent and runs the IBM VM, DOS/VS and VS1 operating systems without user modifications.

By contrast, Kardios users have to rewrite the job control language codes for the peripherals before running any applications.

Described as being slightly faster than IBM's 4331, the fully microcoded V/32 incorporates a variety of integrated controllers that would add significantly to the system's price tag if they were unbundled, Geers said. In fact, he pointed out, the V/32's microcoded and integrated controllers are "the key" to the system's viability to the

For example, Geers claimed that because IBM's 4341 does not have integrated controllers, users have to pay more for these devices than for the processor itself.

Who's Buying?

Summing up, Geers said that for the most part growth in the 370-emulation marketplace is a result of the large supply of IBM software currently the user's disposal from IBM and the independents. And, of course, the result of the low cost of minicomputers as opposed to the price of mainframes.

Most of Kardios's customers are former 360/40, 360/50 or IBM timesharing users who considered but "really could not afford a 370-line machine," Parks noted. In addition, the Perkin-Elmer 3220 buyers thought the IBM 4331 didn't offer the growth potential they wanted, and the 4341 was just too expensive.

Finally, although the growth of the 370-compatible systems market is currently relatively slow, the concept is by no means headed for extinction. For instance, Formation entered the emulation arena with a system that is said to match the performance of a 370/138, is 370 program-equivalent and will soon have a memory expansion capability four times that of the 138.

The Model 4000 Information System can handle the DOS/VS, OS/VS1 and VM 370 operating systems and is scheduled for shipment later this year.

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Price Not Only Reason

(Continued from Page 57) own system without sacrificing or paying extra for on-line programming, employing a systems programmer to watch the computer or spending a lot of cash, according to Mike Frehse, the library's information systems supervi-

Renting time for the municipal computer center located in nearby City Hall did not work out, particularly since the library had more than 500,000 users and an inventory of 25 million books. Not only was the IBM computer down for about 12 hours each week, but the library's card input system was subject to jams or operator errors. Moreover, people on the staff never took the DP work too seriously because they were never directly involved with the computer, Frehse said.

IBM Ruled Out

Since the library is heavily involved with Isam, it was impossible to rewrite the IBM-geared software programs without a major outlay of time and money. That's why officials there considered a number of 370-compatible system vendors and even looked at IBM's 370/138.

The IBM mainframe was ruled out almost instantly because of its cost (more than \$700,000), its need for special air conditioning and the possibility

that a systems programmer would have to be hired to babysit the computer, Frehse explained. In addition, IBM charges extra for an on-line programming package, necessary to the organization's operation.

After eliminating other vendors, the library settled on the Kardios system which, with 14 CRT terminals, costs about \$360,000, or \$80,000/year. The library had been footing a \$250,000/year bill for using the mu-nicipal IBM system.

After modifying the job control lan-guage codes of the IBM-based software, the library implemented all the packages on the Perkin-Elmer computers. Currently, the system has 768K bytes of memory and 1G byte of disk storage space. Monthly downtime with the minicomputer is limited to about four hours, Frehse noted.

But the most important advantages of the library's computer is the fact that it is on-site and doesn't require a systems programmer or programming staff to watch it 24 hours a day, the library's DP head pointed out.

The system doesn't need "that guy that sits in the back room and knows nothing about anything except IBM software . . . takes care of the IBM operating system and interfaces with IBM about all [its] problems."

CA Processors Tied To Industrial Control

IRVINE, Calif. - Computer Automation, Inc. has interfaced its Naked Mini 4 and LSI-2 computers to industrial control applications with the introduction of 64-bit TTL I/O mod-

The modules feature 40-pin lockingtype connectors and allow a variety of I/O data formats to be monitored by the computers, including four 16-bit words or up to 64 discrete stimuli such as switch closures, a spokesman said.

Byte or word data formats are supported with each module, and onboard terminating resistors are provided to eliminate the need for a terminator board, he added.

The half-card devices can handle

positive and negative true I/O and fea-ture switch-selectable interrupt addresses. In addition, eight external strobe lines work in conjunction with eight signal lines to provide a handshake interface, allowing data to be transferred in response to external events, the spokesman noted.

The modules cost \$400 each. Quantity discounts are available, CA said from 2181 Dupont Drive, Irvine, Calif. 92713.

Also Adds Lower Case

Board Doubles Screen Size Of Apple II Micro's CRT

prises has introduced a plug-in intelligent board for Apple Computer, Inc.'s Apple II microcomputer that doubles the 40-column CRT screen size and adds lower case type capabilities.

Called Sup'R'Terminal, the board converts the Apple II screen to an 80-column by 24-line upper/lower case CRT using a 5 by 8 dot matrix and an Ascii character set. The board is user-installable and connects to the CRT via an RCA Corp. connecter jack.

The device is automatically accessed in Pascal or utilized in Basic by typing in a special command, a spokesman

The Sup'R'Terminal contains 2K bytes of software including upper/ lower case shift, cursor movements, cursor modes, scrolling modes, clearing and line-feed functions and character definition capabilities.

User-Defined Characters

Users can define their own characters, switching back and forth among up to 10 different character sets.

The board can act as a self-contained terminal for time-sharing and other applications when used with Apple's communications interface board, the spokesman noted.

The Sup'R'Terminal costs \$395 and is available from Apple microcom-puter dealers. Additional information can be obtained from M&R Enterprises at 418 Arguello Blvd., Suite 2, San Francisco, Calif. 94118.

Customized System Gives Tight Control Of Inventory

Special to CW BROOKLYN, N.Y. - The kind of management information that enables a company to ride herd on materials costs, place a tighter control on inventory and get a better return on its raw materials investment is what a company here said it is getting from a customized small computer system.

Continental Technical Finishes Corp. provides color finishes for such metalusing industries as office equipment and lighting fixtures. Its stock in trade are the formulas it has developed to satisfy the ever-widening range of finishing demands posed by its customers.

The firm recently acquired a Digital Equipment Corp. PDP-11/34-based system with software designed by Computer Assets Corp., a systems integrator with offices in New York and New Jersey. The system has 128K bytes of memory, 10M bytes of disk storage and three CRT terminals.

We wanted someone with both consulting and technical expertise to come in and analyze the situation, then develop a practical and cost-effective response, according to Bernard Fleischer, one of Continental's owners and managers. "Obviously, we did not want to 'tool up' with a heavy-duty hardware base that would require specialized personnel to operate and would, in any case, be out of our price range."

Instant Updating

The system's software stores all color formula data with provision for instant updating from the terminals whenever the cost of an ingredient fluctuates. The cost of the ingredient can be extended through every finishing product the company makes.

The company can query the system at any time to determine the up-to-theminute price of any one product to order a cost breakdown of its items in a category or to get printout of any ingredient in inventory by price.

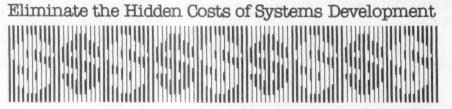
Management can now see at a glance the dollars tied up in the inventory at any one time of raw materials or it can see the ingredient investment in any one product on hand," Fleischer said. "When we have this kind of raw material cost information at our fingertips, reflecting current prices, we can buy and plan more effectively."

'Work-Off' Program'

Inevitably, research and experiment costs are involved in the development of formulas. Computer Assets, there-fore, customized a "work-off" software program that enables the company to release for alternative use materials involved in new product experimentation - another economy in the use of materials.

"Cost control over our formulas, superior inventory control and a pricing system reflective of current raw materials costs, all without the major overhead expenditure of a mainframe sys-tem and specialized computer operators - these are the benefits which we are getting from our customized small computer operation," Fleischer said.





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COMPUTER INDUSTR

Paradyne Hears Beat of DDP Drum

Special to CW

- A new product and an innovative integrating philosphy are spearheading Paradyne Corp.'s march into the 1980s

In assessing the evolution of distributed data processing (DDP) networks, Paradyne found that the development of the DDP concept had resulted in features and functions being added as a reaction to a situation, as opposed to being designed for overall efficiency and coordination. The result has been inefficiency, complexity and higher cost, at the expense of the end user.

"What we've done is provided what we feel is a new approach to communica-tions. We call it the Coordinated Network Architecture,"John P. Wilkins, director

of product marketing, stated. Wilkins noted that since 1975, all of Paradyne's products have been designed to enhance each other in a building-block systems approach. "From the host system on down, every product we manufacture fits into the Coordinated Network Architecture of the distributed data processing system," he said.

The firm's basic product is the modem, and that product is integral to the success of its other products, including PIX II, Pixnet and Response.

Blending of Factions

A number of factors are responsible for Paradyne's philosophy, among them the changes that have taken place in the industry itself. "Customers in the communications business have become more sophisticated in the last three to four years, and the traditional factions between the communications manager and the data processing manager are now blending. You see more managerial power at a level of knowledge than you ever had before," Wilkins observed.

This migration of the "DP side of the to the communications side has helped Paradyne "because users are now looking toward communications companies for data processing solutions as well as communications solutions.

Paradyne's recent announcements of two products - Pixnet and Response [CW, Oct. 22] - are evidence of the way the firm reads the signs for the future.

"Response is designed to be a fully inte-grated distributed processing network system incorporating not only powerful remote processing and applications soft-ware development capabilities, but also communications links that eliminate the need for IBM/teleprocessing software,' according to William Siegrist, vicepresident of product marketing.

With Response we tried to meet the total objectives of networking - the man-(Continued on Page 66)

1979 Revenues Attest:

Competition Healthy in IP&S Industry

INDIANAPOLIS - Although IBM's information products and services (IP&S) accounted for 16.3% of the \$10.2 billion in revenues earned by the top 100 companies in this field last year, the giant hardly dominates the industry, according to a recent survey released by International Computer Programs, Inc. (ICP).

The IP&S industry is dominated by a relatively small group of companies, but the competition is quite healthy, ICP said.

The top 25 companies in the industry accounted for 79% of the industry's revenues last year, according to the "ICP 100" survey. The top 50 firms produced 92% of the revenues.

Rule not Holding

Despite this concentration, the "ICP 100" noted that the 80-20 rule - 80% of the business belongs to 20% of the companies - is gradually diminishing. For example, in 1978 the IP&S revenues for the top 20 firms came to \$6.27 billion, or 75.2% of the total. In 1979, however, the revenues of the top 20 dipped to 73%, or \$7.45 billion, of the total industry revenue.

Attesting to the growth rate of the lower echelon of the top 100, these 80 firms experienced a revenue jump of \$671 million, or 32.5%, last year. This compared with a revenue increase of \$1.2 billion or 18.9% for the top 20 firms.

On the whole, all the companies in ICP's (Continued on Page 66)

NO.	COMPANY NAME	1979 RANK	REVENUE (Millions)	REVENUE (Millions)	% GROWTH 1975 - 1979	REVENUE (Millione)
1	Control Data Corporation	2	\$710.	\$886.	25%	8176.
2	International Business Machines	1	\$1,537.	\$1,669.	9%	8132.
3	NCR Corporation	4	\$421.	\$541.	29%	8120.
4	Digital Equipment Corporation	5	\$308.	\$422.	37%	8114.
5	Burroughs Corporation	3	\$492.	\$566.	15%	874.
6	Automatic Data Processing, Inc.	6	\$299.	\$371.	24%	872.
7	Computer Sciences Corporation	8	8277.	\$343.	24%	166.
8	Hewlett-Packard Company	11	\$154.	\$218.	42%	884.
9	Hational CSS, Inc.	25	\$49.	\$110.	124%	\$61.
10	Electronic Data Systems Corporation	10	\$218.	\$274.	26%	156.

Ten Firms With Largest IP&S Revenue Growth: 1978-1979

Burroughs and CDC Post Gains

Despite gloomy economic predictions, both Burroughs Corp. and Control Data Corp. reported healthy first-quarter earnings and revenues.

Burroughs' revenues advanced 14% to \$673.6 million from \$588.4 million in 1979's first quarter. Earnings rose 13%, reaching \$47.6 million or \$1.16 per share compared with the \$42.1 million or \$1.03 per share

posted in the year-ago period.

Burroughs Chairman Paul S. Mirabito made little comment on the quarter's earnings other than to say worldwide backlogs reached record levels during the period and business continues to be "good.

Meanwhile from Minneapolis, CDC's earnings from its computer business rose 74% to \$20.5 million from \$11.8 million in the first quarter last year. Revenues advanced 28% to \$629 million from \$492 million a year earlier.

Combined revenues for the company reached \$884 million, a 23% advance from 1979's first-quarter revenues of \$716 million. Corporate earnings grew 36% to \$33.4 million or \$1.92 per share, up from \$24.5 million or \$1.42 per a year earlier.

While CDC expects significant earnings growth this year, that firm cautioned that the growth rate may slow during the year.

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Postal Rate Commission Backs Restricted Ecom

By Phil Hirsch

CW Washington Bureau WASHINGTON, D.C.

"The majority once again recommends nothing more than what it recommended in its prior initial decision — a mail classification which excludes electronic transmission," James Duffy, vice-chairman of the U.S. Postal Rate Commission, said recently.

He was referring to the commission's "reconsidered recommendation," issued a short time earlier, concerning Electronic Computer-Originated Mail (Ecom), a domestic electronic mail service proposed by the U.S. Postal Service (USPS).

The commission's first recommendation was sent to the governors of the Postal Service last December [CW, Dec. 24]. Basically, it supported commercial vendors of electronic message services (EMS) by concluding that the USPS, at least initially, should restrict itself to converting electronic mail messages into hard copy at the delivery post office and delivering them by mail carrier.

Request for Changes

Last February, however, the governors sent the initial recommendation back to the Postal Rate Commission with a request for several changes. The Postal Rate Commission's recent pronouncement was the response to that request.

Among other changes, the governors said the commission should authorize Ecom on a permanent basis, rather than the experimental basis proposed last December.

In its response last week, the commission emphasized that it wants the Postal Service to have "a permanent role in electronic mail transmission even though initially, Ecommust be treated as an experiment."

The commission added that if USPS can obtain approval from the Federal Communications Commission (FCC) to launch Ecom, it "can begin implementing the Ecom system tomorrow as far as the Postal Rate Commission is concerned."

Last year, the FCC said USPS could not market an Ecom service that included message transmission unless the Postal Service first obtained a common carrier's li-

Eye of Controversy

Possibly the most controversial part of last December's Postal Rate Commission recommendation was the conclusion that Ecom messages should be transmitted by commercial communications carriers.

These carriers would have to comply with technical inter-

face specifications developed jointly with USPS, but otherwise they would be free of Postal Service control.

The governors, however, asked the commission to change this part of the recommendation by authorizing the Postal Service to set "quality, scope and duration of service standards."

Upon reconsideration, the Postal Rate Commission said, in effect, they had gone as far as they could by providing "a prime role for the Postal Service in developing [interconnection standards]." Last week's recommendation added that "the questions of service quality and potential abandonment of service by a carrier [are] under FCC jurisdiction."

Two Dissenters

Vice-Chairman Duffy, who dissented along with Commis-

sioner Kieran O'Doherty in the recent 3-2 vote on the reconsidered recommendation, said "it is patently clear that, despite protestations to the contrary, the majority continues to erect obstacles to Postal Service entry into the electronic mail field and must bear full responsibility for attempting to abort the birth of this necessary public service."

The FCC's recent decision deregulating "enhanced"

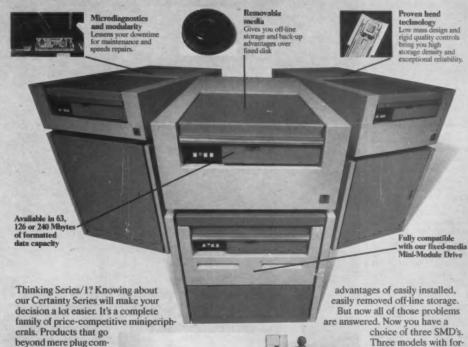
communication services [CW, April 14] greatly simplifies the governors' task.

Previously, a final decision authorizing USPS to begin offering a "bundled" Ecom service, including transmission, would have run afoul of the FCC's earlier ruling that such an offering can be marketed only by a licensed carrier.

But the commission has now said that such services do not have to be offered by carriers.

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IDC Sees Nonimpact Printer Market Zooming

WALTHAM, Mass. — Users are increasingly turning to nonimpact printers as a means of outputting more information on paper faster, according to a recent industry survey from International Data Corp. (IDC).

Because of this demand, the nonimpact market will zoom over the next few years, with some 6,400 units projected to be in place by the end of 1984, according to IDC estimates. This would be an increase of 228% from 1979's installed base of 1,950 units.

While last year only four vendors sold nonimpact printers, there are now nine competitors in the market.

IBM Corp., Xerox Corp. and Honeywell, Inc. dominated virtually the entire market last year, IDC noted. However, other printers now being marketed include Itel Corp.'s 7800, Univac's 0777, Documation, Inc.'s Lasepage and Datagraphix, Inc.'s 9800.

Of special interest is Uppster Corp.'s PEP-6510 that uses fiber optics, pulsed light and electrophotography, IDC con-

All told, these other models will account for only about 3% of the market in 1980 but will increase slowly to 9% by 1983, the report predicted.

Dominant Suppliers

Although other companies have entered the market, IBM will continue to be the dominant force, controlling a 46% share of the market with about 2,900 units installed by year-end 1983.

Xerox is considered the number two supplier, capturing 41% of the market last year.

Of that 41% of the market held by Xerox, sales of its 1200 system accounted for 31% of the market, but the company is phasing out that model in favor of its Model 9700.

Last year 10% of Xerox's market share was garnered through sales of the newer unit. By the end of 1983, about 2,000 of these units will be installed. IDC forecast.

Honeywell's Page Printing System (PPS) rounds out the current competitive environment. Honeywell will attain an 11% share of the market by 1983, installing 700 units by

that time, the report stated. While the PPS is the lowest

While the PPS is the lowest priced of all the models — \$31,606 vs. IBM's \$36,300 price tag and \$35,240 for the Xerox 9700 — it does have some drawbacks, IDC noted.

In particular, the PPS system uses dielectric paper which is more expensive than conventional paper and requires the purchase of individual printing drums priced at \$335 each in order to create custom

forms.

By contrast, Xerox 9700 forms are all software controlled and can be used in word processing systems, a function Honeywell's PPS cannot perform.

A feature distinguishing the various systems is paperhandling methods, IDC noted. Both the Xerox and Honeywell models use cut sheets. However, the PPS relies on roll paper rather than single sheets. The IBM 3800, meanwhile; uses continuous forms paper. IDC concluded that future applications for the office indicate a stronger potential for the cut-sheet format.

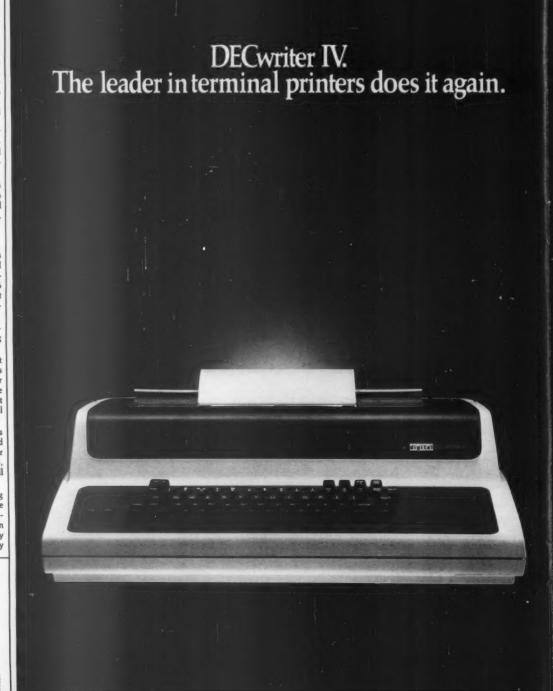
Lower Speed Printers

Lower speed nonimpact printers will begin to appear this year, the research firm noted, but will account for less than 2% of deliveries this year. However, this percentage

should expand to 20% by

Possible entrants to the slower speed market are Data Printer Corp., Decision Data Computer Corp. and Centronics Data Computer Corp., IDC noted.

The report entitled "High-Speed Nonimpact Printers at Central Computer Sites" is available for \$2,000 from IDC at 214 Third Ave., Waltham, Mass. 02254.





Datapoint Agrees to Buy Inforex

SAN ANTONIO, Texas - Datapoint Corp. \$3.2 million and \$6.4 million. has signed a letter of intent to acquire Inforex, Inc. The agreement hinges on the resolution of the data entry firm's reorganization under Chapter 11 of the Federal Bankruptcy Laws.

Although details of the acquisition were not disclosed, the companies indicated that Inforex's shareholders would be likely to re-ceive only the current market value for Inforex's stock.

In recent weeks that stock has traded between \$1 and \$2 per share, which would result in an eventual purchase price of between

selling 300 baud terminal printer ever made.

The DECwriter II set whole new industry

In a separate announcement, Datapoint said it acquired an option to buy Inforex's foreign subsidiaries.

Other Bids Rejected

Datapoint's bid comes after Inforex rejected bids by McDonnell Douglas and Four-Phase, Inc. to separately purchase parts of the com-pany for a total of \$25 million. While in 1978 Inforex reported revenues of

\$71.4 million and earnings of \$3.5 million or 91 cents per share, last year the firm experi-enced a loss in excess of \$9 million.

Xerox Opens 'Supermarket' To Retail Office Products

DALLAS - Promising to be the "supermarket for the of-fice," the first Xerox Corp. retail store opened here recently.

In addition to copiers and typewriters, the store is selling word processors, facsimile units and small computers made by Hewlett-Packard Co., Apple Computer, Inc. and Panasonic.

These small systems are priced between \$1,295 and \$13,800, Xerox said.

Overseeing the corporation's retail operation is Robert F. a corporate vicepresident, who is also president and general manager of Xerox's newly formed Retail Markets Division.

Xerox is planning on opening three more stores in the Dallas-Fort Worth area within a few months and three more in Denver by midyear.

Plans to Branch Out

"If these first seven stores provide the return on investment we expect, we have wellformed plans to branch out with other stores in other areas of the country later this year and next," Reiser said.

Many products will be kept in stock for customers to carry out of the store. However, those products requiring special installation will be installed and serviced by the same Xerox employees who currently provide these services for equipment sold by the firm's branch offices.

The store's clientele is expected to be small business establishments and professionals such as doctors, lawyers and architects.

MAI Arranges **Project Financing** For Sorbus

NEW YORK - Manage ment Assistance, Inc. (MAI) has arranged for \$7.5 million in financing to be used to con-struct new headquarters for its maintenance subsidiary, Sorbus. Inc.

The 10-year financing for the project was obtained through the sale of industrial revenue bonds issued by the Chester County Industrial Development Authority in Pennsylvania.

Purchased by a major U.S. financial institution, bonds have annual fixed interest charges of 7.75% for the first seven years, floating at 75% of prime thereafter.

In the standard LA 34 friction feed con-If you know anything about terminal printers, you probably know something about our LA36 DECwriter II—the largest figuration, you can use rolls or sheet paper in any width up to 14%".

Take a minute to snap in the tractor-feed option, and the DECwriter IV converts to handle standard or custom forms up to

Forms as narrow as 3". Or as wide

All in a portable printer no bigger than an office typewriter.

So why put up with all the restrictions you get with other terminals. Restrictions that cost you time and money.

With the DECwriter IV, one size fits all. For 30 day delivery, contact your terminals supplier or write to: Digital Equipment Corporation, Terminals Product Group, MR2-2/M67, One Iron Way, Mariborough, MA 01752.





standards for reliability and performance. And now there's the DECwriter IV.

With the DECwriter IV, we used the same sound thinking and proven features that made the **DECwriter II so suc**cessful. True 30 CPS throughput. Microprocessor control. Switch-selectable 110 and 300 baud rates, and solid state components for unmatched reliability.

But then we added a capability to the DECwriter IV that sets it apart from the competition even more.

Unequalled flexibility in paper handling. The DECwriter

IV gives you all this flexibility because a terminal that can't handle all types of paper isn't just inconvenient. It's also expensive.

For instance, some terminals restrict you to using 81/2" x 11" paper—sideways. Which may be fine for some jobs, but awkward for others.

Others force you to put up with the high cost and short shelf life of thermal paper. And they can't handle multi-part forms

But the DECwriter IV matrix impact terminal lets you use the right paper for every job. Which means no waste. Easy filing, too.

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ICP Survey: Competition Healthy in IP&S Industry

(Continued from Page 61)

top 100 showed an average growth rate of 22.3%, which translated into a \$1.86 billion revenue increase for the industry.

Although the 80-20 Rule experienced some modification last year, the major hardware manufacturers, which garnered 56% of IP&S revenues, remained steadfastly in the top 10, ICP noted. Even in this rarefied atmosphere, however, there was some jockeying for position.

Automatic Data Processing, Inc. moved into the sixth slot of the top 10, up from No. 7 last year. Computer Sciences Corp., finishing eighth this year, nudged Sperry Corp. back to ninth rosition.

But there is still a lot of leverage for IP&S sales when a vendor also sells computers, ICP concluded. The top 10 computer makers had IP&S revenues of just over \$5 billion, accounting for about 50% of the industry's total revenues.

With only two exceptions, the 10 firms with the largest IP&S revenue growth last year were also ranked in the top 10. While Hewlett-Packard Co., already in 11th place, wasn't much of an exception, the growth experienced by National CSS, Inc. was a surprise.

National CSS managed to more than double its revenues to \$110 million, a 124% jump from 1978. It finished 25th in the rankings, up from No. 33 last

year

In terms of total dollar growth, however, Control Data Corp. turned in the largest leap, increasing its IP&S revenues by \$176 million and beating out IBM's \$132 million increase.

This resulted in a nearly 20% growth rate in IP&S for CDC between 1978 and 1979, compared with a relatively anemic 7.9% jump for IBM, ICP observed.

Releasing the survey at its recent

100.	COMPANY NAME	1979	1978 IPAS REVENUE	REVENUE	REVENUE (Millions)	% GROWTH
1	Compumera Corporation	94	84.	\$10.	86.	150%
2	National CSS, Inc.	25	849.	8110.	861.	124%
3	Anacome, Inc.	48	813.	829.	\$16.	115%
4	NVIP, Inc.	59	89.	819.	810.	111%
5	Comphere, Inc.	36	826.	863.	827.	104%
	Xerox Computer Services	34	831.	862.	831.	100%
7	Raynoids and Reynolds Company	26	855.	\$103.	\$48.	87%
	Insurance Bystoms of America, Inc.	66	811.	818.	87.	84%
	Software Design Associates, Inc.	90	87.	\$11.	84.	87%
10	Cullinana Corporation	80	80.	814.	86.	88%

Chart Courtesy of IC

Ten Firms With Largest Percentage Growth of IP&S Revenues

conference in New Orleans, ICP this year expanded the survey to include the top 100 companies. Last year, which marked the introduction of the survey, ICP covered only 50 compa-

Further information on the survey can be obtained from ICP at 9000 Keystone Crossing, Indianapolis, Ind. 46240.

Paradyne Marching to Beat of DDP Drum

(Continued from Page 61) agement, the programmer and the user aspects," he said. "If you look at classic distributed processing, going back to a mainframe that was IBM, you have IBM programmers and you also

sic distributed processing, going back to a mainframe that was IBM, you have IBM programmers and you also have distributed processing programmers. The formats that were used in the remote sites were different from those used in the central site, and you would probably even have some programming at the remote sites."

Response was designed to eliminate

Response was designed to eliminate all that. "You do the programming all at the central site and pass it out to the remote sites," he stated.

"You can couple [Pixnet] with the Response philosophy of being a lookalike 370 system, with power equivalent to a 135/138; give the capability to do transaction processing with its own unique operating system; and couple that with communications efficiency of going anywhere in the country as if you were local."

Paradyne's entry into the DDP market did not put it into a different competitive market because the traditional DDP vendors "don't classically do the communications the way we do," Siegrist said. "The biggest advantage of Pixnet/Response is the way it communicates, with much less overhead. We can go to a point and pass much more intelligence from that point than anyone else because of the way we do the communications."

Paradyne's business has been good, too. Net earnings before extraordinary credit for 1979 totaled \$4.1 million or \$1.19 per share compared with \$1.6 million or 55 cents per share the pre-

Revenues for fiscal 1979 rose 60% to \$41.4 million from \$25.9 million in the prior year.

In order to increase its penetration of the European market more rapidly than could be accomplished by a startup marketing effort, Paradyne recently entered into an agreement in principle to acquire Computer and Systems Engineering Ltd. (Case), a British distributer of Paradyne modems and a manufacturer of multiplexers, concentrators and message-switching equipment.

The firm has, however, had to "startup" additional manufacturing space to keep up with the demand for its products. Last July, 30,000 sq ft of manufacturing space was added to the existing plant, bringing it to a total 90,000 sq ft.

An additional 100,000 sq-ft facility is being built for manufacturing and operations. Paradyne also operates a 30,000 sq-ft manufacturing facility in Puerto Rico.

Siegrist expects this happy economic state to continue: "As the telecommunications industry, or on-line systems, mature, the value of these networks will become much larger, and as their value becomes larger, our growth will continue."

unique opportunity for data communications marketers to open the door to the People's Republic of China.

We have already concluded a very successful mission to the People's Republic (PRC), and our second will be leaving on May 29th.

The Fourth Ministry Machine Building has asked us to organize a second trade mission to the PRC, and it has been scheduled for May 29th to June 14th.

Top-level representatives from a limited number of companies will be invited to present seminars to Chinese computer experts and managers on the topic of "Data Communications Equipment Selection and Use."

This is a unique opportunity to introduce your company and products to the leading buying influences in a multi-billion dollar marketplace. But time is short. Please get in touch with us right away if you would be interested in attending. We'll be happy to send you more details, including a report on our first trade mission, just concluded in March.

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Executive Corner

 Phyllis Sherry Swersky has been promoted to treasurer of the Cullinane Corp.

 Richard C. Benkendorf has joined Quanex Management Sciences as executive vice-president.

 Datamatics Management Services, Inc. has named Robert K. Boustedt vice-president of marketing and sales.

 Edward F. Thompson has been elected a vice-president of Amdahl Corp. and Stephen S. Smith has been elected vice-president of business planning.

 Frederick B. Schudel has been named vice-president of manufacturing, Robert (Jerry) Bacon has been named director of rigid disk and central manufacturing and Sanford Raab has been named director of material at Pertec Computer Corp.'s Peripherals Division.

 Syed Zaidi has been named vicepresident of engineering for ECS Microsystems. Inc.

 Peter W. Smith has been appointed vice-president of finance for Data Printer Corp.

 Martin Goldstein has been elected vice-president and treasurer of DPF, Inc.

 Precision Data, Inc. has named Richard H. Towle vice-president of finance.

Michael T. Smith has been ap-

pointed director of operations for the Terminals Division of Perkin-Elmer

 Informatics, Inc. has promoted Glenn L. Yammarino to vice-president and general manager of its Information Management Systems Division.

 Dallas L. Talley has been appointed senior vice-president of marketing and Mike McCorry has been made director of domestic marketing for Quantel Corp.

John M. Ludutsky has been appointed director of marketing for Lear Siegler, Inc.'s Data Products Division.

 Anthony Wainwright has joined Integrated Circuit Engineering Corp.'s Consulting Division as head of its LSI Design Center.

 Computer Automation, Inc. has announced the appointment of Samuel T. Soberanes as vice-president of marketing and sales for its Commercial Systems Division.

 James J. Kelly has been appointed vice-president of operations of Megadata Corp.

 Sidney C. Haw has been appointed vice-president of marketing and sales for the Data Communications Division of Penril Corp.

 Northwest Computer Services, Inc., a subsidiary of Northwest Bancorporation, has named David Van Lear as executive vice-president.

Doing it on Kodak film costs less.

An impact printer can chew up an awful lot of paper. Trouble is, the paper it chews up is costing you more and more every year.

This year, you can expect to pay about \$29.00* per 1000 pages of 3-part computer paper, 56% more than you paid two years ago.

With the price of paper climbing higher and higher, consider the advantages of owning a Kodak Komstar microimage processor. This dry laser printer doesn't use *any* paper. It prints on microfilm, instead. Rather than spending \$29.00 to print a 1000-page, 3-part report, you'll spend only about \$1.00, the price of 9 microfiche.†

A Kodak laser printer works on-line *or* off-line. It's 6-8 times faster than an impact printer, which means you can save more on time and labor. It takes 50 minutes to decollate, burst, bind, and package a 1000-page report against only 9 minutes to print, duplicate, and package the same report on microfiche.

If savings like these interest you, send us the coupon for more information. Or ask your Kodak representative for a demonstration of Kodak Komstar microimage processors.

Better make up your mind soon, though. Before the next increase in paper prices does it for you.

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PRC Seeking Outside DP Help

BOSTON - Years behind in almost every aspect of computer technology, the People's Republic of China (PRC) is seeking outside expertise to help it reach its modernization goals.

But a group of suppliers who recently returned from a trade mission to the PRC noted that the Chinese are so far behind technologically that both their modernization goals and the large market for information will not materialize overnight.

A major factor hampering the PRC's development of information processing is that its technical training currently does not produce skilled ap-

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Disaster Planning

Seminars in cities across the U.S. For more infor-mation call C.R. Boyd at (602) 264-7241. plications programmers, analysts or any other kind of computer personnel outside of the scientific arena, the U.S. suppliers indicated.

The country is just beginning to buy some hardware mostly minicomputers and microcomputers - but officials have no concept of the software and programming involved in using the equipment, according to participants of the China Trade Mission organized by CW Communications, Inc.

Cash Shortage

The country is also critically short of currency, and the Chinese must attempt to establish reciprocal trade agreements instead of dealing in cash. But several mission members noted that the Department of Machinery, the agency with whom they are required to deal exclusively, has nothing of interest for computer suppliers in trade.

The Chinese appeared to recognize this problem, however, and mission members agreed the government will quickly be remedying the situation.

John Maguire, president of Software AG, Inc., expects the Chinese market to be substantial, but said it will take time to develop.

In the meantime, Maguire has invited two top Chinese officials to the U.S. so they can observe computer exper-tise in this country firsthand. Participants agreed that the

technology stems both from the desire to increase its information handling capabilities and also to eventually compete in the world market — a feat which most agreed the Chinese could eventually accom-

But the economic and technical problems will create more difficulties than the politics, mission members concluded.

Personal Contacts

Participants recommended that first-time visitors to the PRC participate in trade missions since it is an "ideal way" to meet personally the proper Chinese officials. Establishing personal relationships is key to conducting business with the Chinese, they noted.

Companies sending repre-sentatives on the mission included Quodata Corp., Bonner & Moore Consulting Services, Retida, Inc., Computer Applications and Training Analysis, Software AG and Advanced Systems, Inc.

The mission was the first of several organized by CW Communications, Inc. at the request of the Chinese government. A second trade mission concerning Data Communications Equipment Selection and Use is planned for May 29 - June 14.

Information about the mission is available from Diana LaMuraglia, manager, international marketing services, CW Communications, Inc., Rt. 30, Framingham, Mass.

Meet to Cover Communications

WASHINGTON D.C. The Electronic Industries Association's (EIA) Communications Division will hold its fifth annual conference in Hyannis, Mass., on May 27-29.

The theme of the conference "Trends and Directions" and targets members of the financial community. The con-ference is divided into three panels composed of executives from telecommunications manufacturing and operating companies.

These panels are "Communications for the Office of the 1980s," moderated by Winston Himsworth, vice-president of Saloman Brothers; "Equipping Networks for the 21st Century," moderated by Stover L. Babcock Jr., assis-tant vice-president of Merrill Lynch Pierce Fenner & Smith, Inc; and "Emerging Information Delivery Systems," moderated by Richard Greulich, assistant president of Citibank

The meeting will be held at Dunfey's Hyannis Hotel. More information is available from the EIA at 2001 Eye St., N.W. Washington,

Continental Telephone To Buy Network Analysis

ATLANTA — Continental Telephone Corp. and Net-work Analysis Corp. have signed a letter of intent allowing Continental to purchase 55% of Network Analysis' outstanding shares. During the next six years, Continental plans to purchase the remaining stock

The initial phase of the investment reportedly will total some \$3 million.

Network Analysis is a 10-year-old consulting and research firm involved in telecommunications planning and network analysis. The firm has designed and implemented telephone and data networks for leading business firms and government agencies including General Motors Corp., Xerox Corp., the Department of Defense and the Federal

Commenting on the agree-ment, Dr. Howard Frank, president of Network Analysis, said his firm is in the process of evolving from designtelecommunications networks to becoming a supplier of turnkey communications systems.

Continental's resources will enable us to accelerate this evolution and move beyond it to other expansion areas." noted.

Likewise. Continental is expanding beyond its traditional telephone operations into areas such as interconnect markets and satellite communications.

Last year Continental re-ported sales of more than \$1 billion and net income of \$114.3 million.

Orders & Installations

Fidelity Union Bancorp. of New Jersey has installed a statewide banking system designed and manufactured by Racal-Milgo, Inc. for its 84 branch banks.

Computer Research Co. (CRC) has installed an Amdahl Corp. V8 CPU, replacing an IBM 370/168 system. CRC plans to install a second Amdahl V8 unit in May of next vear.

Public Service Co. of Indiana, Inc. has ordered a Scan-Data Corp. 2250/1 optical character recognition (OCR)

areat offer!

and billing information, and the National Data Corp. of Atlanta has ordered and installed a Scan-Data 929 docu-

American Computer Services (ACS), a Chicago-based computer services bureau, has ordered a Univac 1100/60 to be delivered in May.

Saga Corp., a California-based institutional food company, has ordered a Honeywell, Inc. Page Printing System valued at \$162,000. The contract calls for a 12,000 line/min system.

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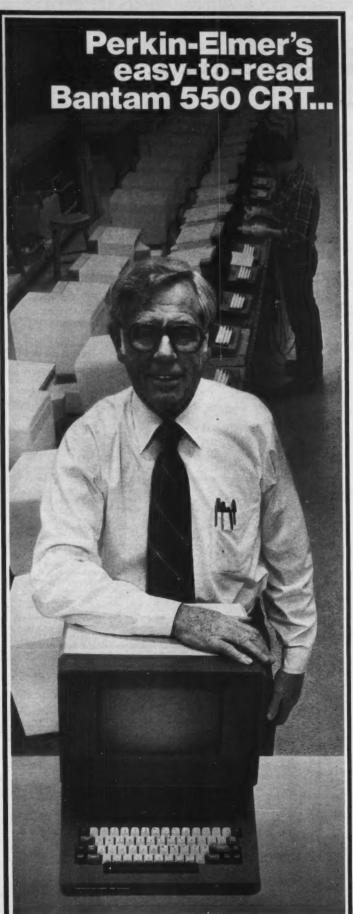
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There's also fixed-position tabbing. Full cursor addressing from the host. Repeat, tab, print, on/off line, back space and shift lock keys. A complete sure-touch keyboard with shadow numeric pad. Options include an anti-glare etched grey or green CRT, printer port, current loop, international power and character sets.

The crisply styled Bantam measures only 15" wide, 19" deep and 14" high, and weighs a mere 28 pounds. Yet it's tougher and more reliable than its competitors, thanks to its custom LSI chip.

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HMI49. Information Systems Through COBOL, 2nd Ed., Andreas Philippakis and Leonard J. Kazmier.

This book uses COBOL as the programming language and as the vehicle for discussion of systems concepts. It includes comprehensive coverage of the COBOL programming language based on principles of structured programming that does not require any previous exposure to programming or computers. This book enables the reader to write COBOL programs almost immediately. This edition includes greater emphasis on the relationship between information systems concepts and techniques of COBOL programming. \$18.95

HM064.

Investing On Your Own: How To Find Winning Stocks In Your Own Backyard, Richard L Thorsell.

The guidelines of this book move step by step from the original selection process to the final buy/sell decision, explaining how to find, evaluate and analyze the stocks of small local companies. There is a prospect list of 7,200 companies, organized geographically by zip code, including the company's address and the name of its chief executive officer. \$14,95



HM156.

The Analysis, Design, and Implementation of Information Systems,

Henry C. Lucas, Jr.

This practical introduction covers techniques of systems analysis and design as well as implementation from the user's standpoint. Part One provides a perspective on information systems and on a new approach to systems design. Part Two examines systems analysis and design. \$20.95

HM168.

The Corporate Computer: How to Live With an Ecological Intrusion,

N. Sanders.

This book shows managers in all industries how to create, organize, and reorganize a computing function for their firm. The emphasis is on the howto aspects of managing the computer installation—or its output. \$15.00



Elementary Structured COBOL: A Step by Step Approach, 2nd Ed., Gordon B. Davis, Margrethe H.

Olson and Charles R. Litecky. This is a problem-oriented approach to writing and maintaining well-structured programs in COBOL. Practice exercises in writing programs begin immediately so that the reader can grasp the fundamentals of COBOL through application. There is added emphasis on structured programming and disciplined program writing, as well as a more convenient explanation of the COBOL features pertaining to sample programs. \$14.95

CD176. Word Processing, Walter Kleinschrod.

300 loose-leaf pages with everything you need to know to install a successful word processing system in your organization. Exhibits, checklists, tables and charts help you through a six-point plan for determining the best, most profitable word processing system for your company's particular needs. \$59.50



HM152.

Principles of Interactive Computer Graphics, 2nd Ed., William Newman and Robert Sproull.

This unified, comprehensive guide ranges from the essential principles of interactive graphics to a completely cohesive strategy for designing graphics systems. The authors include five complete chapters on raster graphics, as well as detailed information on user interface design, curve and surface manipulation and shading. The section on graphic output software takes the reader step by step through the different software elements that together form a device-independent graphics system. \$24,95

HM067.

Saving Money Through Ten-Year Trusts, William A. Hancock.

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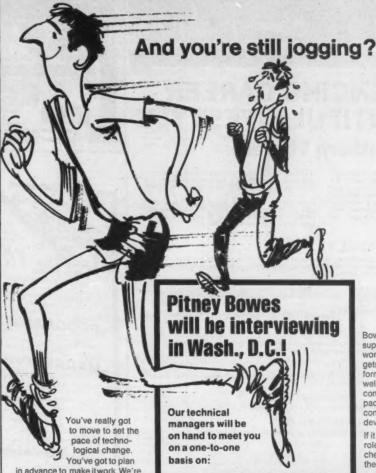
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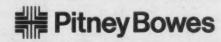
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 Performance
 Trade Studies and Analyses
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Systems Architecture

- Nodal fregration
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 Development of Nodal Equipment Block Diagrams
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- Cable Architecture Requirements
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- Radio Architecture Requirements Radio Systems Requirements Radio Terminal Requirements Antenna Requirements Timing and Synchronization HW/SW Partitioning BIT/BITE Requirements Secure Interfaces

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 | Sub-system interface Definition
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 PIPH IA relatecture
 Computer Security
 Bennie Software Change
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 Grammunication Processing
 Betal Time Communic Control Processing
 Computer Development Support
 Betach Marking
 Performance Frade Offis
 Alrhorne Unique Software Bequirements

Systems Integration

- ☐ Test Planning Analyses ☐ Lugistic Support Analyses ☐ A & OD Technical Analyses
- A & OD Technical Analyses
 Operational Analyses
 Maintenance Analyses

System Requirements Development

- Functional Flow Diagrams
 Forms B Functional Requirements
 B-1 Prime them Development Specifications
 B-5 Computer Program Development
 Specifications
 Operational/Maintenance Time Lines

Cos nd and Control

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- Operating Systems Including Secure Operating System
- System

 Communications Software
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 CAMMS Software
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 CAMMS Software
 Personnel Authoritication Software
 Authority Software
 Diagnostic Software

Systems Operability

- Systems Operability Concept
 Man-Machine Interface
 Dioplays and Controls

Processors and Interfa-

- ☐ Processors
 ☐ Bulk Store Technology
 ☐ Processor Interfaces
 ☐ Performance Trade Offs

- C¹ Subsystem
- Data New Architecture Requirements
 MF Radio Protocols
 Either Optic Cable Protocols
 Communications Protocols
 Message Formats
 Message Responses

Radio Systems

- Widehand Annospheric Noise Measurements
 Rough Terrain Surface Wave Propagation
 Measurement
 Trapagation Available
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 Communications System Resign Concepts / Analysis

- Radio System Design

- | Higher Order Modulating Technology |
 | Error Detection and Correction |
 | Spread Spectrum Communications |
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 | Implementation Feasibility Considerations |
 | Mr Radio Conceptual Design

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- | Radio Network Service | Radio Network Layout | Protocols, Brusting Algorithms, Multiple Access | Standards Operation Disciplines | Performance Estimation, Reaction Times, Survivability | Airborne Entry/Control

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Widehard MF Broadcast American USE/SSS Satellite Terminal American VLEHE VHF and USE American VHE Modele Radio American

MF Tealing Wire Antennas MF Ferrite Loop Antennas UNIF/SSF Saediae Antennas VLE HE VHE LINE and SSF An

Cubie Systems

- Secure Voice Order Wire Commu
 Secure Voice Switched Network
 VHF Mobile Padio Communication

- Cable Data Network Architecture
 Cable Network Bouling Protocol
 Network Traffic Modeling
 Survivable Cable Communication

- Fiber Optic Communication System
- ☐ Fiber Optic Cable Connectivity
 ☐ Fiber Optic Modern Design
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 Environmental Constraints Analysis

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 ICD Requirements

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Security Systems

- Secure Communications Equipment Integra
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 Security Studies

- **Herdness and Survivals**
- EMP Analysis and Test

EMP Analysis SGEMP Analysis EMP Test Requirements Analysis Allocations Analysis EMI/TEMPEST

- Radiation Analysis and Test

Analysis Requirements Analysis Ilest

- Special Studies
- ☐ Hardness Assurance/M ☐ Subcontractor Support ☐ Thermal/Mechanical ☐ Fiber Optics

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 Nodal Requirements Allocation
 Maintenance Management (CAMMS)
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 BITE, BIT, SEAF TEST Requirements
 Fund Error Requirements
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 HW/SW Allocations
 SW Architecture

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 Integration of BL/Dt. Functions
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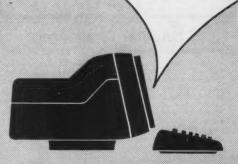
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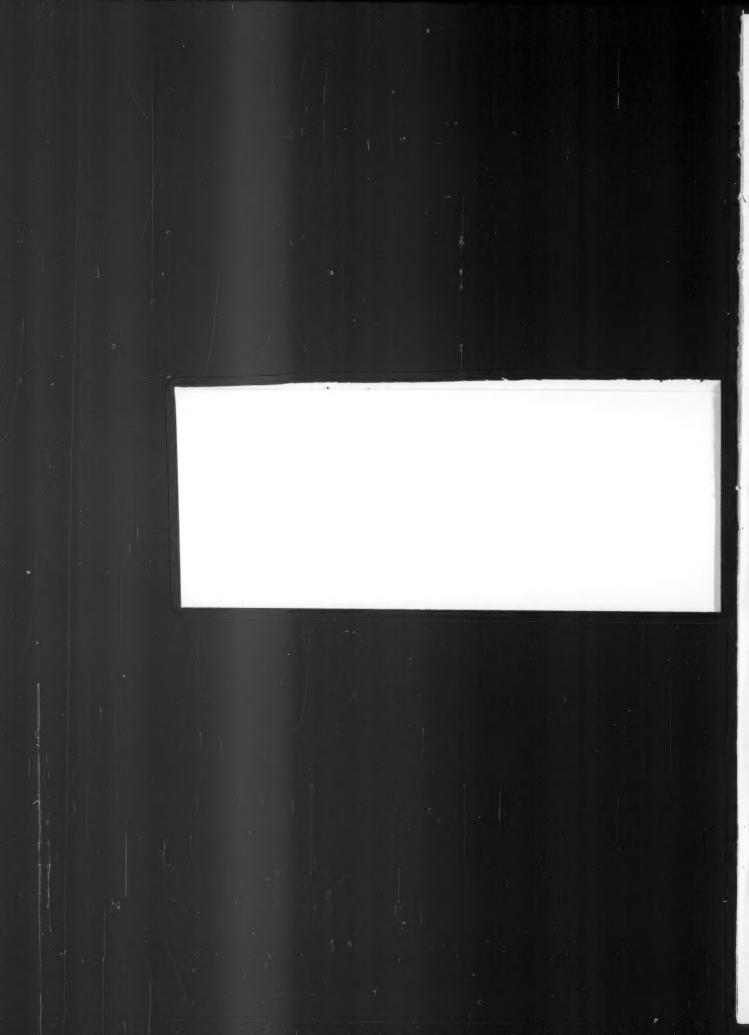
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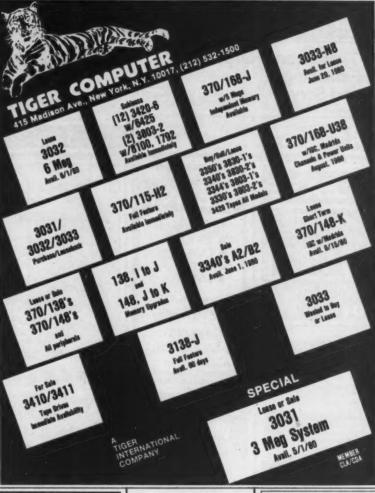
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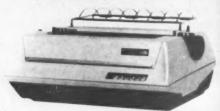
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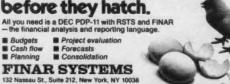
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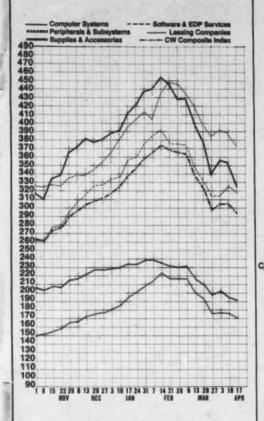
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